Specialty Crop Block Grant Agreement No. 14-SCBGP-VT-0051

Final Performance Report to USDA-Agricultural Marketing Service

Attn: Gabriella Hill
Cc: Carly Borgmeier
Date: December 28, 2017 Revised January 26, 2018

Submitted by

Address: 116 State Street
Montpelier, VT 05620-2901

Contact: Kristina M. Sweet
Senior Agriculture Development Coordinator
Phone: (802) 522-7811
Email: kristina.sweet@vermont.gov

Project Reviews

Project 1: Vermont Digital Traceability Project for Produce Growers – Final Report

PROJECT SUMMARY

This produce tracking and traceability project focused on solutions for small and medium-sized Vermont farms. Large wholesale buyers have begun to demand produce traceability systems, and many additional grocery stores and distributors are expected to require produce traceability over the next few years. These market demands for traceability are being driven by federal legislation in the form of the Food Safety Moderation Act (FSMA) Produce Safety Rule (PSR) and food safety concerns as well as ingredient certifications such as organic and GMO-free labeling.

Most Vermont specialty crop producers do not have the financial means to research tools and techniques to comply with these food traceability requirements. The "Vermont Produce Traceability Project" aimed to enhance food safety in Vermont's food system by identifying traceability systems appropriate to produce growers at varying scales and piloting these systems with farmer partners in order to provide a suite of traceability solutions to produce growers and service providers in Vermont and promote adoption of produce traceability systems.

PROJECT APPROACH

This project aimed to improve produce tracking and traceability on Vermont farms. Vermont farmers and buyers were surveyed related to produce related data systems, tracking and traceability. The Produce Safety Alliance Training modules, Food Safety Modernization Act (FSMA) Produce Safety Rule (PSR), and USDA GAPS Checklists were reviewed to summarize record keeping requirements associated with tracking and traceability. The project team reviewed over 65 software solutions considered relevant to the need for produce tracking and traceability. This review took the form of web-based research, gathering grower / user experiential learning via phone interview, using trial / sample accounts of solutions and attending training webinars on products. This list was narrowed to 14, but several new options were

added when research uncovered new information. The final number of solutions that we researched extensively was 17. Out of the 17 that were researched, 6 were noted to have continued merit. Unfortunately, based on our review we found that there were no strong options for commercially available software systems that support the anticipated needs of produce tracking among Vermont's small- and medium-sized farms in the face of the FSMA PSR. The project plan was adjusted mid-term to adapt to the need for development of appropriate near-term solutions.

Based on our review of stakeholder need and available solutions, we developed parallel path focused on near-term, highly flexible solutions that would be most beneficial to Vermont's small and medium-sized producers using standardized spreadsheets and open-source web-based record keeping as follows.

1. Standardized Spreadsheets - Some farms have developed customized spreadsheet based solutions that integrate farm planning and tracking. These solutions are likely to remain the best option for early adoption of digital tracking and traceability in the near term among those farms that currently have no digital system. The project aggregated and standardized spreadsheet based approaches to planning and tracking resulting in a set of Google Sheets.
2. FarmOS Open-Source - In parallel with the development of simple standardized spreadsheets, the open-source approach by FarmOS was leveraged to provide a tailored, cloud-based, and mobile / responsive solution that integrates with whole-farm record keeping and management.

The project has successfully developed prototype record keeping systems according to this re-plan. A set of Google™ Sheets have been developed to allow easy capture of required records on any device. Additionally, a new Produce Safety module has been developed for FarmOS. The two approaches have also been developed to integrate with each other using comma-separated-variable (CSV) format data import and export. These tools provide necessary guidance and functionality to log farm activities related to food safety and to initiate the necessary data stream to allow for produce tracking and traceability.

Our next steps include outreach and pilot testing of each approach. We have also identified future work related to the need for (1) automated lot number generation, (2) improved off-line access to FarmOS, (3) improved integration with QuickBooks™, and (4) improved integration with label printing systems.

Christopher W. Callahan – UVM Extension, Project Director – provided overall project leadership and management. Chris took over the project from Stan Ward, the project founder and initial leader who completed the initial survey work and project planning. Michael Kilpatrick – In the Field Consultants, Project Consultant and Tech, provided support in summarizing functional requirements and reviewing available solutions against them. Michael Kilpatrick also developed the spreadsheet recordkeeping templates. Michael Stenta – Farmier and FarmOS, Developer and Programmer – provided web development services in developing the tailored FarmOS Produce Safety Module.

GOALS AND OUTCOMES ACHIEVED

Goals. In order to achieve this intent, the following **project goals** were established:

1. **Improve understanding** of the current state **of information technology** systems and knowledge in place and in use **on VT farms**. RESULT – The survey work has established a baseline understanding of what information technology is used by farmers in Vermont. This has been reported at VVBGA meetings and is published on the UVM Extension Ag Engineering web page.
2. **Increase** grower and service provider **knowledge of produce traceability requirements** related to the tracking needs of the sector across all scales of production and compliance regimes. RESULT – A summary of the record keeping "functional requirements" that support tracking and traceability has been developed. These requirements are published on the UVM Extension Ag Engineering web page,

have been used to develop two near term solutions for Vermont farms, and are available to others to assist in the development or advancement of other solutions.

3. **Increase** grower and service provider **knowledge of available produce traceability solutions**. RESULT – Project findings have been reported as interim results and conference presentations are planned for the Winter '17/'18 by the project lead. Pilot testing is planned with partner farms in Winter/Spring '18 of the developed solutions. There is very strong early interest among service providers in the produce safety arena based on interest expressed from their stakeholder growers.
4. **Provide a suite of pilot-tested produce traceability solutions** appropriate for Vermont farms at varying scales to growers and service providers. RESULT – As noted above, the review of relevant commercially available solutions led to the conclusion that there were none that were really ready for pilot testing. This led to the need to develop near term solutions which led to a re-plan of the project to do so. The project has successfully developed prototype record keeping systems according to this re-plan. A set of Google™ Sheets have been developed to allow easy capture of required records on any device. Additionally, a new Produce Safety module has been developed for FarmOS. The two approaches have also been developed to integrate with each other using comma-separated-variable (CSV) format data import and export. These tools provide necessary guidance and functionality to log farm activities related to food safety and to initiate the necessary data stream to allow for produce tracking and traceability.

Objectives. The project was originally conceived to achieve these goals through the pursuit of the following **objectives**:

1. **Analyze & Summarize**: Analyze and summarize data already collected as part of the Vermont Digital Traceability Project for Produce Growers (grower surveys, buyer interviews, list of digital technologies). Publish an interim report and share with produce and service provider networks.
2. **Identify Potential Traceability Solutions**: Develop a short list of technology solutions including paper-based, DIY spreadsheet, and commercially available options.
3. **Pilot**: Engage six farmer partners in the research and demonstration project who will commit to exploring potential solutions in order to screen their functionality and ease of use.
4. **Report & Share**: Create a fact sheets outlining requirements for produce tracking and a consolidated summary report of produce traceability solutions. Share with produce and service-provider networks.

Based on the results of activities completed under objectives 1 & 2, the project plan was adjusted to focus on development of an improved paired solution of spreadsheet templates and a FarmOS-based produce safety module. Trial licenses have been obtained under the funding provided for this project to enable pilot testing of the new module by 6 Vermont farms beginning in Winter 2017/2018.

BENEFICIARIES

This project was completed to provide record keeping guidance to the entire population of 789 Vermont produce growers in support of tracking and traceability. Although the farms that will benefit the most from this type of solution are far fewer than this figure, the intent of integrating the produce tracking and traceability functionality into FarmOS has been to support an increase in farm data management in general, which will likely benefit all farms.

LESSONS LEARNED

The project premise assumed that commercially available solutions would be found and piloted, with a subset being forwarded with recommendations. The reality was that none of the commercially available

solutions were well aligned with the needs of Vermont farms relative to produce tracking or traceability and none were aligned with the record keeping requirements of the FSMA Produce Safety Rule. It is sometimes hard to predict what exactly may work for farms until starting a project like this in earnest. The project team identified the significance of this finding and adjusted the plan to achieve a reasonable outcome.

CONTACT PERSON

Chris Callahan, UVM Extension | 802-447-7582 x256 | chris.callahan@uvm.edu

ADDITIONAL INFORMATION

Videos, copies of the survey results, final report and links to FarmOS and Google Sheets can be found on the project webpage at http://blog.uvm.edu/cwcallah/produce-tracking-and-traceability.

Project 2: Vermont Maple Business Benchmark – Final Report

PROJECT SUMMARY

This goal of the Vermont Maple Business Benchmark was two-fold: 1) provide meaningful business management education to increase the competitiveness of individual maple producers and 2) develop a body of applied research and public information to facilitate viable development across the entire VT maple sector.

Two key trends provided the motivation for this project when it was proposed in 2014. First, innovation in technology and maple production practices have motivated many new start-ups and expansion of existing operations. The combination of new investments and new debt service requires that producers are more mindful over the cost, expenses and eventual profit margins.

The second key trend is the softening of bulk maple prices that is outside the control of a single producer. In recent years the majority of attention has been placed on the US/Canadian currency exchange rates. At the time of this report (August 2017) the growing inventories at major maple distributors have confirmed that market growth may not be keeping up with multiple strong production years. Supply and demand factors now appear to be influencing prices. At the time of this report, bulk maple syrup has dropped to $2.00 per pound from market highs of ~$2.85 per pound in 2012 (~30% decrease) Producers are feeling the pinch on margins the importance of cost management and market planning has increased.

This Specialty Crop Block Grant Program project combined applied research, educational events and individual technical assistance to enhance the performance of new and existing maple enterprises. The following outputs were achieved during the grant period:

- The project reached 430 attendees at maple workshops over the duration of this project.
- Maple reports have been published and delivered to and downloaded by at least 370 individuals.
- Special trainings have been provided to 41 agricultural lenders and farm business advisers.
- Print, radio and television programs have been used to disseminate program information throughout VT and the maple production regions.
- Program participants have demonstrated an improved understanding of maple business management and converted this education into positive changes made for their businesses.

PROJECT APPROACH

Our project approach was to combine our experience as technical assistance providers, outreach educators and researchers into a business education project to support the Vermont maple industry. We used an applied research lens to develop a cost analysis tool box capable of assisting participating maple producers with their decision-making. The same cost analysis tool box was integrated into a group benchmarking model to develop broader industry metrics. These benchmarks were used by participants (the maple producers that provided their data) to support internal decision-making and the benchmarks then became the foundational information for group educational programs and publications. Certain participants contributed data as a matter of public good. These producers wanted to make a contribution to a project they felt could help the industry at large. Other producers sought an opportunity to receive technical assistance to help them organize and analyze their financial records. Through the process they benefited from the analysis of their own business and they could work with an adviser to comparing their individual financial situation to the group benchmark metrics. A final group of producers played no role in the benchmark "research" process but they have utilized our publications and technical assistance.

The list below summarizes the flow of projects steps during the course of the grant:

- Provide a cost of production analysis program for commercial maple producers to analyze the financial performance of their business.
- Promote improved management decisions related to: cost/expense containment, re-investment strategies, break-even price analysis and production strategies.
- Provide confidential benchmark comparisons for participating farms to compare themselves to other similar operations.
- Publish public maple finance resources to support new prospective maple business owners
- Present project findings at industry meetings and conferences
- Convene and cross-train with industry leaders, lenders and business advisers
- Disseminate information through a variety of media formats

The table below compares proposed outputs and actual outputs reported through June 30, 2017.

From Proposal	Actual Outputs Reported
150 managers attend presentations over 2 years	• 430 conference attendees from 2015-2017
An additional 150 managers receive benchmark information via publications.	• 2013/2014 Benchmark Reports have been distributed to 275 people in person and 272 downloads from the program website. (547 Total) • Maple Financial Workbooks (excel budget template): 107 downloads
25 Managers participate in cost of production analysis and are able to compare their business to other maple producers.	• 17 producers completed financial analyses in 2015 (with 2014 finances) • 15 producers completed financial analysis in 2016 (with 2015 finances) • A total of 32 detail financial analyses were completed with Vermont maple producers during the project period. • 8 producers organized and provided 2016 financial data for future reports
3-5 current or prospective owners apply for financing for start-up, expansion or key investments.	• 5 producers received additional technical assistance to support business plans and feasibility studies.
20 Commercial Lenders/Finance Providers attend training sessions	• 41 agricultural lenders and farm business advisers attend special trainings

20,000 Vermont residents Across the Fence (ATF) television program	• 1 ATF show aired in March 2016 • VT Edition (VPR) Interview at Farm Show (January 2016) • VT Edition (VPR) Maple Program (March 2016)
6-8 articles and reports produced and adapted for popular press	• 2014 Maple Business Benchmark Report Published • 2015 Maple Business Benchmark Report *(this publication has been delayed, but it will be available in September 2017)* • Maple Digest Article, Fall Issue 2016 • Maple News Article, May 2017
2 grant proposals to expand this work	• UVM REACH Grant, Awarded 2016 • USDA Rural Business Development Grant, Not Awarded 2016 • Working Lands Enterprise Board, Awarded 2017

GOALS AND OUTCOMES ACHIEVED

The bulleted list in the "Project Approach" section describes the analysis research, publications and technical assistance that leads to the outcomes we report here. At the close of the project we were able to utilize financial records from participating maple producers, follow-up interviews and evaluations to record and measure the project outcomes.

Program evaluations were distributed online using the Survey Monkey service. Two separate evaluations were distributed. Evaluation One "Maple Business Resources" was sent to 92 individuals who provided contact information when they attended workshops or when they downloaded online resources. An online Wufoo tracking system was embedded in our website through this project to create a database of online users. This enabled our first ever survey to website users and it will serve as an important evaluation tool for the program into the future. Twenty-two recipients completed the evaluation. Response rates were lower than expected despite two reminder emails. Evaluation Two "Maple Benchmark" was sent to maple producers that participated in cost analysis and data collection for the benchmark. This evaluation was sent to 20 producers and was completed by 8 at the time of this report.

The table below provides a summary of the proposed goals, measures and targets compared to the "Accomplished" outcomes highlighted in the far right-side column. Further description of the outcomes is provided following this table.

GOAL – Proposed	PERFORMANCE – Proposed	TARGET– Proposed	ACCOMPLISHED
Project results used to facilitate capital investment in the maple sector.	3-5 loan applications or owner investments proposed.	Investments approved and executed. Estimated Maple investment of $112,000 x 3 = $336,000 proposed. **Total Investments: (planned or proposed): $1.34 Million**	TA #1: $125,000 (approved loan) TA#2: $30,000 producer investment to add taps TA #3: Pre-loan business plan support. $135,000 proposal, still in process TA #4: 20,000 tap start-up. $500,000 loan proposal submitted winter 2017, still in process. TA #5 Expansion Project: $435,000 investment, project on hold due to market conditions. TA #6 3,000 Tap expansion: $33,000 investment TA #7: 4,500 tap expansion cash flow plan: $50,000 loan plus personal investment TA #8: Sap delivery truck investment: $40,000
Producers identify and manage costs that are in their control.	10 producers are able to reduce costs by 2.5%.	10 producer x $3,612 = $36,120 in reduced costs	TA #10: Sap price correction: $6,000 in reduced costs Financial analysis of all back-to-back year participants (11): $63,366 in total cost reductions. **Total Cost Savings: $69,366**
Producers adopt cost-based pricing and market strategies.	10 producers adjust pricing/market plan to match their costs, estimate 2.5% price increase.	20 x $4,250 = $85,000 increased sales	TA #6: market shift and improved prices results in +$30,665 in increased sales TA#9: market shift results in +$5,000 in increased sales. TA #11: market shift plans for $20,000 in new sales, $10,000 in actual new sales accomplished **Market Improvements: +$45,665 in sales**

Producers compare their business to established benchmarks.	50% of producers requesting resources engage in business comparison.	75 farms report adoption of benchmark concept to inform their decisions.	289 producers (See description below.

Cost Management

We were able to compare total costs for two consecutive years for 11 producers. Seven of these producers demonstrated a reduction in overall costs totaling $63,366. One should use caution when reporting this outcome. Four producers during the same period had their costs increase. In certain cases cost reduction was not feasible. Many producers have actually taken on new short-term costs to make necessary investments. The hope is that these investments can improve yields and will reduce costs per unit of syrup produced over the long term. It will take multiple years of tracking to monitor that outcome.

Comparisons to Established Benchmarks

64% of respondents to Evaluation One: Maple Business Resources indicated they used the information from this project to compare themselves to other producers. When we extrapolate that 64% across the 272 online users that downloaded our resources (many more producers received copies of reports at presentations/trade show events) we get a total of 174 potential producers that compared their business to other producers. We add that number to the 17 participants in the financial analysis collection project and calculate that at least 289 producers used comparative benchmarks to improve business management as a direct result of this project.

Technical Assistance

This section summarizes the relevant project activity and outcomes for specific producers that received technical assistance. Each producer/business is identified with a number.

TA #1	• Financial planning for 2,500 tap set-up and $125,000 loan application
TA #2	• Provided general financial guidelines to assist in planned expansion from 700 taps to 1,500 and make $30,000 investment in tubing systems.
TA #3	• Assisted in pre-loan business planning review for a 3,000 tap planned new enterprise and no less than $135,000 in investments (this number does not include the total real estate investment that will be apportioned more to household/lifestyle rather than the maple business)
TA #4	• In depth business planning to guide and finance the start-up of a 20,000 taps enterprise. Current finance proposal is $500,000 in commercial finance ($400,000 long term loan plus $100,000 line of credit for working capital). $200,000 in new gross sales is expected from this business. • 300 new acres brought into active maple production. The 10 year plan includes the management of over 750 acres of leased woods and planned expansion to 50,000 taps
TA #5	• In depth feasibility planning to expand a 3,000 tap enterprise to 15,000 taps. The proposed project would have added 220 acres into maple production and created gross sales expansion of $135,000 in syrup sales. • The proposal requires at least $435,000 in capital and possibly more as project site-work advances on the new sugarhouse. The project has gone into a pause mode. Business planning and comparison to maple benchmarks demonstrated there were very high risks to undertaking this expansion plan as maple prices began to fall. • The owner continues to manage a 3,000 tap enterprise and will wait until market prices rebound and is it more feasible to make this investment.

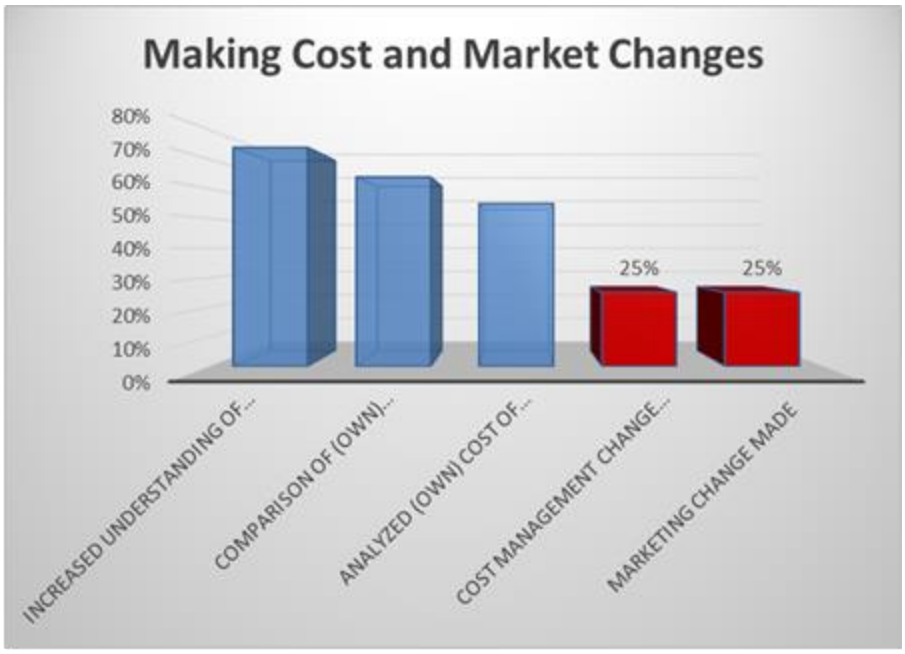
TA #6	• Costs analysis and business planning for expansion from 8,000 taps to 11,000 taps. Personal Investment of 3,000 x $11 supplies (self-installed) : $33,000. • New gross sales $48,000 from tap expansion ($3,000 taps at their $2.86 per lb average and 5.5 lbs per tap). • Facilitation of succession planning has resulted in 1 full time FTE added to business. • Shifted the mix of maple outlets and increased direct retail/wholesale activity while reducing bulk sales. Sales increased to $3.24 per pound compared to $2.94 the previous year. Based on the annual production the market shift resulted in + $13,465 in sales in year 1 and +$17,200 in year 2.
TA #7	• Provided financial planning and budget preparation support for a 4,500 tap expansion (Caledonia County). $40,000 loan application plus $10,000 personal investment. ($50,000 total investments)
TA #8	• Provided financial analysis that enabled decision to by a new sap delivery truck with a new loan of $40,000.
TA #9	• Completed cost analysis and compared to market trends. This prompted a new market plan with two key approaches: a) Conversion to Organic resulted in $0.25 per lb premium. Based on annual yields this resulted in a $2,502 increased sales year 1 + $2,500 in increased sales for year 2 for a total of $5,000 in overall sales growth.
TA #10	• Annual financial analysis reveals that they have been overpaying (mis-pricing) the sap they purchase from other producers. $6,000 dollars saved after renegotiating sap purchases
TA #11	• The cost analysis in year one revealed that true costs were higher than expected. • Break-Even analysis demonstrated the need to increased gross sales ~$20,000 in order to break even on costs. $10,000 in improved sales accomplished during the project period. • The owners decided to increase wholesale of syrup to get paid more than bulk sales and start to make progress on developing new sales accounts to accomplish this.

EVALUATION HIGHLIGHTS

Evaluation One: Maple Business Resources
The information below shows the learning outcomes and changes to management for maple producers that attended single workshops and accessed program resources (publications).

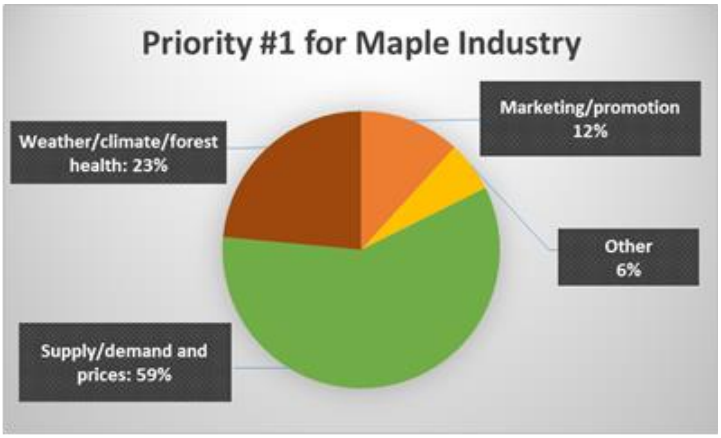
The top three education outcomes reported on this survey were: a) increased understanding of maple business, b) comparison of (own) business to others and c) analyzed (own) cost of production.

Resource users did report actual cost management and marketing changes but these changes are not as common as the "best management outcomes" in the table above. This reinforces our original project method to provide individual technical assistance as the primary method to facilitate and evaluate actual management changes being made.



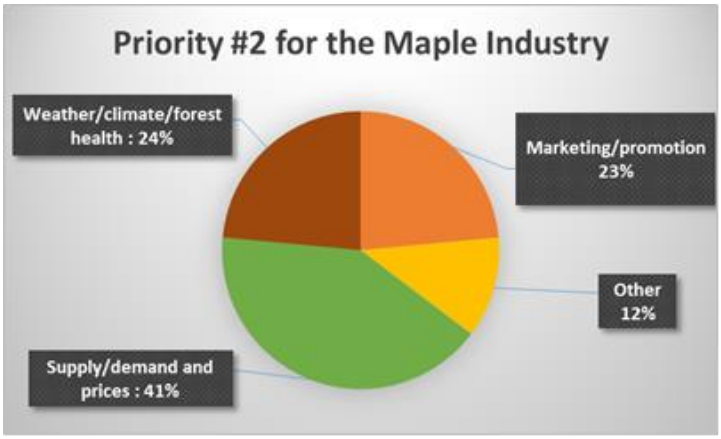
Maple Industry Priorities

A final question to the survey asked our audience what they thought the top three priority issues are facing the maple industry today. The majority of comments related to the current concerns about preventing overproduction and addressing supply/demand/pricing issues. Other priorities included concerns about weather/climate and marketing/promotion.



Evaluation Two: Maple Benchmark Evaluation

This second survey was used in conjunction with the financial records from producers that participated directly in benchmark analysis. The graph to the right demonstrates how producers have converted analysis to decision making and changes to the business.



Grants Proposed to Complement/Build from this Project

The Vermont Maple Benchmark project started in a pilot stage from 2013-2014. This Specialty Crops Grant was the second grant that supported this Maple Benchmark project. The project team has worked to sustain this ongoing initiative with new grant proposals listed below. The project is funded to continue through 2018!

1. REACH Grant, UVM Office of the Vice President of Research (Awarded June 2016)
2. Rural Business Development Grant, USDA Rural Development (Not Awarded, May 2016)
3. Working Lands Enterprise Board, VT Agency of Agriculture, Food and Markets (Awarded May 2017)

BENEFICIARIES

This project was designed to serve three stakeholder groups: a) current maple producers, b) prospective maple producers and c) agricultural development professionals/ industry representatives.

Current and Prospective Maple Producers

- All of the participants for the benchmark analysis aspect of this project were current producers over 2,500 taps.
- Both current and prospective producers contacted UVM to request individual technical assistance and general resources from this project.

Agricultural Development Professionals / Industry Representatives

- A small number of agricultural professionals attended general education events. This is expected given that the number of people working in this topic area in Vermont is outnumbered by producers.
- Special trainings were provided to agricultural lenders and farm business advisers to familiarize them with the maple resources developed through the benchmark project.

Maple Report Users

Who are you?

Choices	Percentage	Count
Maple Business Owner (Existing Business)	*33.98%*	35
Future Maple Business Owner	*27.18%*	28
Industry Professional	*12.62%*	13
Educator/Researcher	*11.65%*	12
lender	*3.88%*	4
landowner	*0.97%*	1
ag lender	*0.97%*	1
Other [View]	*8.74%*	9
	Total	**103**

The chart above demonstrates who accessed our online maple resources through this project at the time of this report. (The total of 103 is higher than the mi,nrt of users at the time we distributed and analyzed evaluations.)

LESSONS LEARNED

Throughout the duration of this project we have been reminded by participants and maple industry leaders how valuable this work is right now. As business planners by profession our project team has a

preference to financial analysis. Through the course of this project we have realized how important market planning is in relation to solid financial analysis. In most cases, producers show a tendency to use financial analysis to inform how and where they will market syrup.

Findings from the 2014 Benchmark and the soon to be published 2015 Benchmark have now provided 3 years of standardized financial analysis applicable to single producers and the industry at large. The project team can refer to this data to conclude that a current bulk maple price falling below $2.00 per pound is not sustainable for most maple producers. There are some larger producers capable of operating profitably at these lower prices, but they are not the majority of producers. With the given financial data we have analyzed we feel that maple prices will need to normalize near $2.20-$2.40 per pound to be feasible for the current profiles of producers we have worked with. We recognize that there still remain maple producers that would need prices higher than $2.40 per pound. For those groups solutions may lie in alternative marketing, expansion to reach a more efficient scale of operation or possibly exit from the sector. Domestic maple marketing and supply/demand balancing are major issues that producers would like to see addressed in relation to the decline in the bulk maple price. Some producers will seek to sell syrup directly but the majority of producers (either by number or volume of production) still seek to sell their syrup to an intermediary packer.

A primary lesson learned with our project steps is that financial benchmarking methods are not easy. It is very difficult to maintain a project with the competing demands of timely technical assistance, preparation of outreach education content and robust applied research methods. We inevitably found ourselves behind schedule in the conversion of raw financial records into standardized analyses. We continue to work to complete the 2015 Maple Benchmark report with data that was collected throughout 2016. Meanwhile, producers are requesting meetings to work on real-time financial analyses right now in 2017. These lessons prompt the team to reevaluate the capacity required to maintain the project in a way that can produce results faster for participants and the public.

Overall, we are pleased to see how the continuum of applied research, outreach methods and technical assistance can enhance owner education and impact meaningful changes to businesses.

CONTACT PERSON

Mark Cannella, UVM Extension | 327 US Route 302, Barre, VT 05641
Mark.Cannella@uvm.edu | 802-476-2003

ADDITIONAL INFORMATION

- 2014 Maple Benchmark Report & 2015 Maple Benchmark Report available from http://blog.uvm.edu/farmvia/?page_id=394.
- 2016 Maple Conference Presentation
- 2016 North American Maple Syrup Council Conference Presentation
- 2017 Maple Conference Presentation: Business Planning
- 2017 Maple Conference Presentation: VT Maple Benchmark

Methods

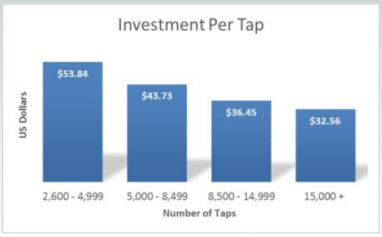
- 2 – 3 visits for records analysis.
- Individual Reports
  - Break-even analysis
  - Net Returns to Real Estate

Financial Methods

- Operating Income - Expenses
- Accrual Adjustments on Inventory & A/P & A/R
- Depreciation: Straight-line method on purchase price
- Valuation of Owner Labor ($18/hour)
- No Real Estate Costs!!

2014 Producers

- 17 Producers
- Taps
  - < 5,000 Taps: 7
  - 5,000 – 8,499: 4
  - 8,500 – 14,999: 3
  - 15,000 + : 3
- RO: Early Adopters
- Markets:
  - 9 Bulk Producers
  - 8 Mixed Market

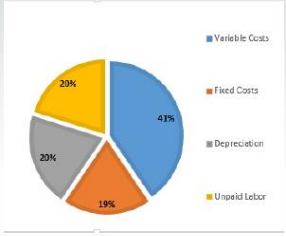


Expenses as a % of Income

Variable Cost Total	38%
Fixed Cost Total (not including depreciation)	18%

Non-Cash Items

Unpaid Labor	19 %
Depreciation	20%



COP for Operations

Per Tap	$ 9.15
Per Gallon	$ 23.25
Per Pound	$ 2.09

COP for Operations: detail

	Range		Average	Median
	Low	High		
COP (Operations) Per Tap	$ 3.07	$ 19.27	$ 9.15	$ 6.95
COP (Operations) Per Gallon	$ 6.35	$ 61.71	$ 23.25	$ 20.00
COP (Operations) Per Pound	$ 0.57	$ 5.53	$ 2.09	$ 1.79

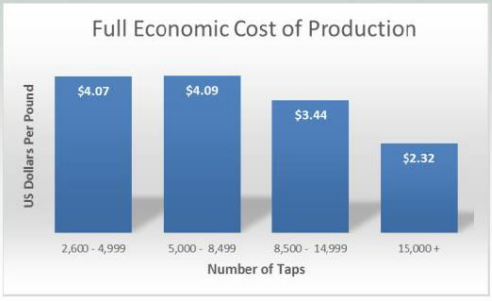
COP with Depreciation

Per Tap	$ 12.04
Per Gallon	$ 30.36
Per Pound	$ 2.72

COP with Depreciation: Detail

	Range		Average	Median
	Low	High		
COP with Depreciation Per Tap	$ 7.06	$ 22.40	$ 12.04	$ 10.40
COP with Depreciation Per Gallon	$ 14.62	$ 67.62	$ 30.36	$ 28.24
COP with Depreciation Per Pound	$ 1.31	$ 6.06	$ 2.72	$ 2.53

Full Economic Costs



Top Performers

- High Income vs. Investments
- Low Depreciation
- No Single Marketing Strategy

High Income vs. Investments

Example B: High yield, higher modern investment costs and mixed markets

Yield Per Tap	5.5 lbs.
Average Income Per Pound	$ 2.65
Investment Per Tap	$ 58
Production Based Income ÷ Investment	25%

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Low Depreciation

- Depreciation: Average 20%
  Range 5% - 36%
- Is this a generational thing?
- Have we distorted depreciation?
  - Salvage Values

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

No Magic Marketing Strategy

High Investment : $55 per tap

High Production: 5 lbs per tap

Low Labor: 7,000 + taps per person

Bulk Price

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

No Magic Marketing Strategy

Average Investment : $45 per tap

Average Production: 3.85 lbs. per tap

Average Labor: 1 FTE per 4,000 taps

65 % Bulk
35% Wholesale

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Adaptive Changes

- Buying Sap !
- Seeking New Markets
- Direct Market:
  A) Scaling-Up: COP should be competitive to embark on direct marketing (not the reverse).
  B) "Preservation Mindset"

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Investment - Markets - COP

- 58 Year Old Owner:
  - Needs to reinvest ?
  - Capital Gains? Start Planning!
- 30 Year Old Prospective Owner seeks to get in.
  - Debt Service
  - Real Estate Costs

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

CULTIVATING HEALTHY COMMUNITIES

Maple Business Benchmark 2014: Preliminary Data

Farm Viability: blog.uvm.edu/farmvia

Prepared by:
Mark Cannella, UVM Extension
Chris Lindgren, UVM Extension
Betsy Miller, UVM Extension

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
www.VermontAgriculture.com

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Purpose

1. Provide meaningful business analysis to increase the competitiveness of individual maple producers
2. Develop public information to facilitate comparisons and planning across the entire VT Maple sector

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Recruitment

- Participant Selection
  - Now 2,500 + taps
  - Various types of business
  - ***Not a random sample***

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

The Process

- Producer Questionnaire
- 2 meetings and clean up
- Cost Analysis Completed and Individual Reports
- All Data Combined in Benchmark Report

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Thanks to the participants !

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Survey Says

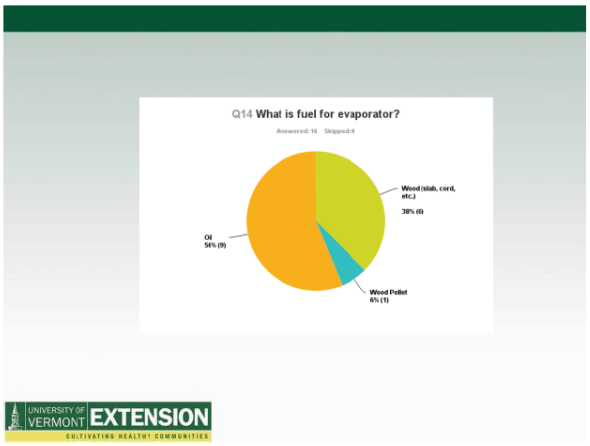
2,500 – 4,999 taps : 5 producers

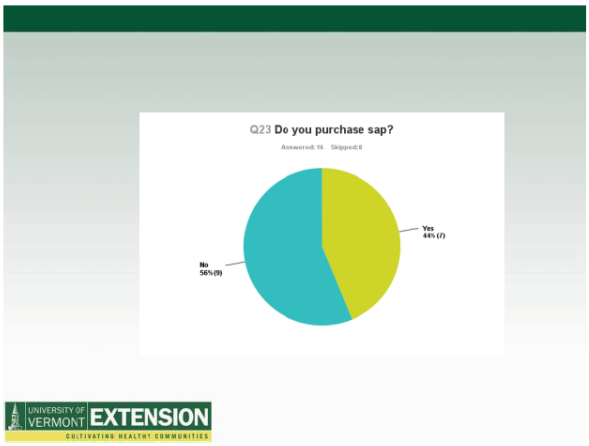
5,000 – 9,999 taps : 3 producers

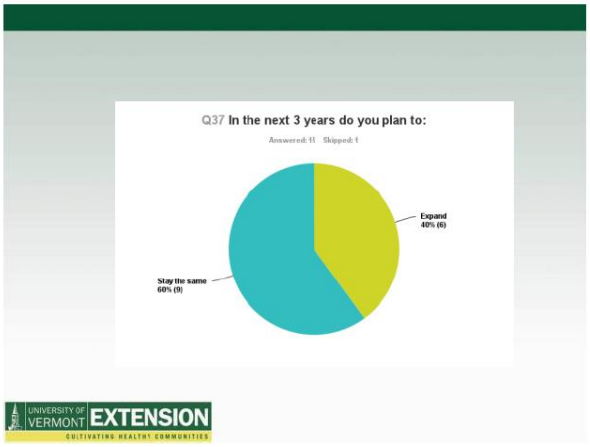
10,000 – 20,000 taps: 5 producers

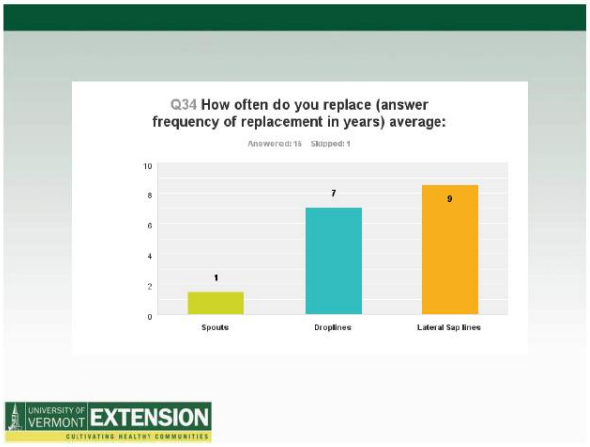
Over 20,000 taps : 2 producers

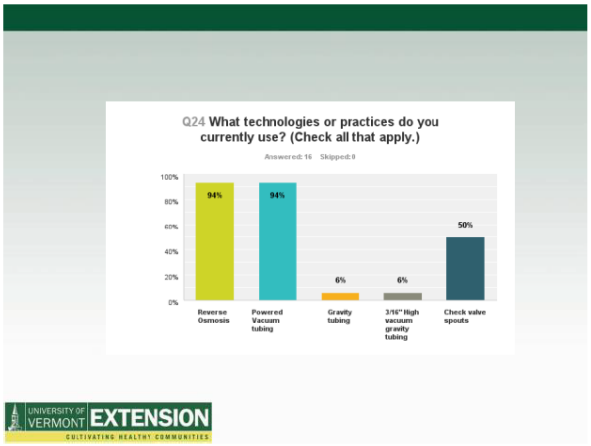
UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

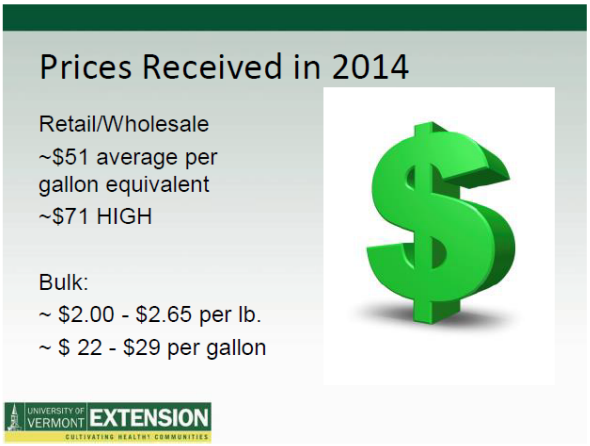

Q14 What is fuel for evaporator?
Answered: 16 Skipped: 0
Wood (slab, cord, etc.)
38% (6)
Oil
56% (9)
Wood Pellet
6% (1)


Q23 Do you purchase sap?
Answered: 16 Skipped: 0
Yes
44% (7)
No
56% (9)


Q37 In the next 3 years do you plan to:
Answered: 11 Skipped: 1
Expand
40% (6)
Stay the same
60% (9)

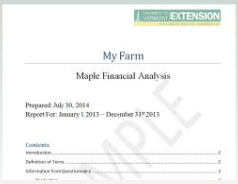

Q34 How often do you replace (answer frequency of replacement in years) average:
Answered: 16 Skipped: 1
10
8
6
4
2
0
1
7
9
Spouts
Droplines
Lateral Sap lines


Q24 What technologies or practices do you currently use? (Check all that apply.)
Answered: 16 Skipped: 0
100%
80%
60%
40%
20%
0%
94%
94%
6%
6%
50%
Reverse Osmosis
Powered Vacuum tubing
Gravity tubing
3/16" High vacuum gravity tubing
Check valve spouts


Prices Received in 2014
Retail/Wholesale
~$51 average per gallon equivalent
~$71 HIGH
Bulk:
~ $2.00 - $2.65 per lb.
~ $ 22 - $29 per gallon

Individual Report

- Definitions and terms
- "Sales"
- Top Expenses
- COP
  - #1: Just operations (no loans/capital)
  - #2: plus Depreciation
  - #3: plus Depreciation and value of unpaid labor



Individual Report

- Investments: purchase price of assets

(No Real Estate)

- Profit: What is left after all other costs are covered.

2014 Preliminary Benchmarks

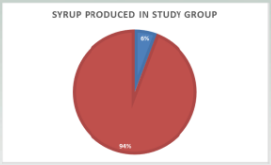
Land Use

- Taps Per Acre (average) : 60
- Sales Per Acre (average): $901

Productivity

	Range				NASS VT
	Low	High	Average	Median	Average
Gallons Per Tap	0.21	0.60	0.41	0.41	0.31

What is the most important technology or technique that contributes to your financial performance?



2014 Vermont Statistics

- 4,350,000 taps
- 0.31 gal/tap
- 1,350,000 total gallons

Investment

	Range			
	Low	High	**Average**	Median
Asset @ Cost Per Tap	$18	$73	**$45**	$33

Expenses per Gallon (Cash Based)

	Average
Fuel (Evaporator Only)	$1.10
Electric	$0.96
Labor (Paid)	$1.96

Expenses per Gallon (Non-Cash Based)

	Average
Unpaid Labor	$12.60
Depreciation	$7.72

Economic Costs are different than Cash Costs!

What matters to you?

What is your time worth?

- We use $18 per hour…
  - We might raise this in future….
  - $30-$40 to oversee biz
  - $10-15 for tasks

What are people paying themselves (before profit)

- Based on Time:
  - 4,000 taps and all direct markets: takes about $35,000 in time (@ $18 per hour)
  - 8,000 – 10,000 taps $20,000 in owner labor, all bulk sales, no direct marketing
- Based on Salary:
  - $40,000 per owner to self market ~15,000 taps
  - $20,000 per owner to mix market 4,000 taps

COP Per Gallon

	Low	**High**	**Average**
Cost of Production (Fully Loaded)	$14	$92	$37
COP (Operations)	$9.55	$52	$27

COP Per Tap

	Low	High	Average
Cost of Production (Fully Loaded)	$ 7.25	$25.01	$15.11
COP (Operations)	$ 3.07	$ 17.39	$ 8.14

COP (fully loaded) by Marketing Channel

Market Channel	Average
Bulk Only (Per Pound)	$ 2.32
Retail/Wholesale Per Gallon	$ 47

Scale

Cost of Production Per Gallon

Taps	Full Group
2,600-4,999	$ 52
5,000 -9,999	$ 21
10,000 – 14,999	$ 38
15,000 – 19,999	$ 31
20,000 over	*Not enough reporting*

Conclusions - 1

- Profits and losses at all scales
- Market Channel influences COP more than scale.
- At under $2.30 bulk price, most producers are going to sacrifice owner pay and/or re-investment

Conclusions - 2

- Self Market, at what scale will the margin cover the extra labor.
- High vacuum maintains production – don't lose track of replacement schedule.
- $0.15 - $0.20 organic premium (almost 10%of base)

5,000 taps = $4,400 plus

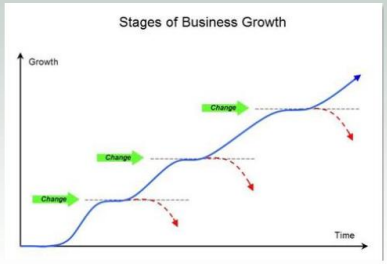
Questions ?

Vermont Maple Conference

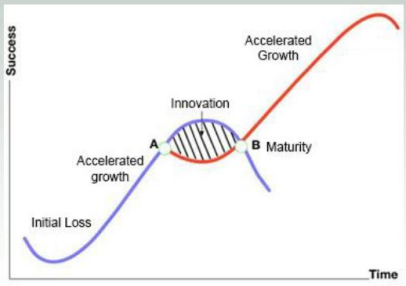
Maple Profitability: Managing for the Long Haul

Mark Cannella
University of Vermont Extension
Mark.Cannella@uvm.edu
Website: blog.uvm.edu/farmvia/

VERMONT AGENCY OF AGRICULTURE, FOOD & MARKETS www.VermontAgriculture.com



UNIVERSITY OF VERMONT EXTENSION CULTIVATING HEALTHY COMMUNITIES



UNIVERSITY OF VERMONT EXTENSION CULTIVATING HEALTHY COMMUNITIES

The Manager

- Critical Skills
  - Production
  - Marketing
  - Management

"What you measure is what you promote"

UNIVERSITY OF VERMONT EXTENSION CULTIVATING HEALTHY COMMUNITIES

Scale and Sweet Spots

- The profit points may be the painful points
- Sweet Spots
  - Single owner
  - Partners
  - Partners plus Employees

UNIVERSITY OF VERMONT EXTENSION CULTIVATING HEALTHY COMMUNITIES

Top Performers

- **Low Depreciation**
- **High Income vs. Investments**
- **No Single Marketing Strategy (different ways to get to profits)**

UNIVERSITY OF VERMONT EXTENSION CULTIVATING HEALTHY COMMUNITIES

Low Depreciation

- Depreciation: Average 20% of Gross Income
  Range 5% - 36%

One Way to Get There

High Investment : $55 + per tap

High Production: 5 lbs per tap

Low Labor: 7,000 + taps per person

Bulk Price

Another Way to Get There

Average Investment : $35- $45 per tap

Average Production: 3.85 lbs. per tap

Average Labor: 1 FTE per 3-4,000 taps

65 % Bulk
35% Direct Retail

Business Cycles

- 58 Year Old Owner:
  - Needs to reinvest ?
    - Sell Sap
    - Initiate Transfer Plan
  - Capital Gains? Start Planning!

Business Cycles

- 58 Year Old Owner:
  - Needs to reinvest ?
    - Sell Sap
    - Initiate Transfer Plan
  - Capital Gains? Start Planning!
- 30 Year Old Prospective Owner seeks to get in.
  - Debt Service
  - Real Estate Costs

VT Maple Benchmark 2014

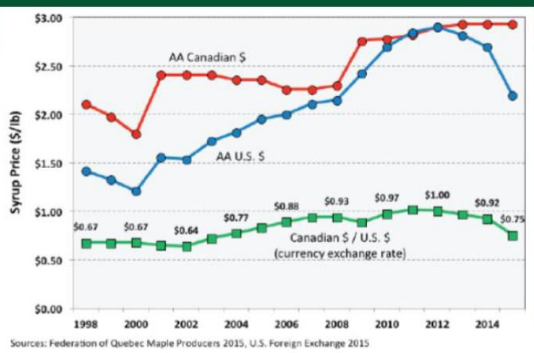
Thank you:
Anonymous Producers

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
www.VermontAgriculture.com

Website: blog.uvm.edu/farmvia/

Objectives

- Information Based Decision Making
- Cost Analysis for Producers
- Public Benchmarks



Financial Methods

- Operating Income - Expenses
- Accrual Adjustments on Inventory & A/P & A/R
- Depreciation: Straight-line method on purchase price
- Valuation of Owner Labor $18/hour…. Going to $22
- No Real Estate Costs!!

2014 Producers

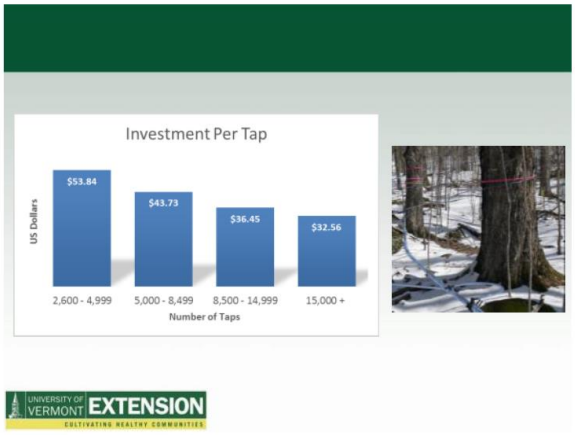
- 17 Producers
- Taps
  - < 5,000 Taps: 7
  - 5,000 – 8,499: 4
  - 8,500 – 14,999: 3
  - 15,000 + : 3
- RO: Early Adopters
- Markets:
  - 9 Bulk Producers
  - 8 Mixed Market

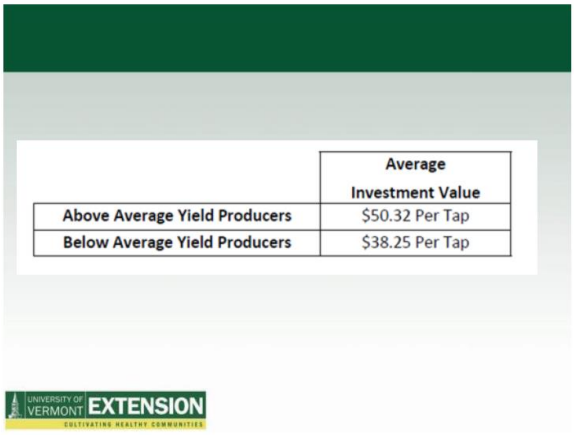
2015 -2016

- 2015 Analysis to be finalized this winter
- 2016 Financial Collection started last week…. Stay tuned

Investment

- Good investments?
  - They directly increase Gross Revenue
  - Decreases Labor input
  - Increase Production





	Average Investment Value
Above Average Yield Producers	$50.32 Per Tap
Below Average Yield Producers	$38.25 Per Tap

Expenses as a % of Income

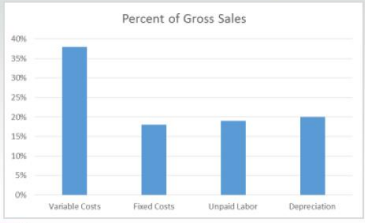
Fuel (Evaporator Only)	3%
Labor (Paid)	7%
Supplies	6%
Electric	3%

Expenses as a % of Income

Variable Cost Total	38%
Fixed Cost Total (not including depreciation)	18%

Non-Cash Items

Unpaid Labor	19 %
Depreciation	20%



COP for Operations

Per Tap	$ 9.15
Per Gallon	$ 23.25
Per Pound	$ 2.09

COP for Operations: detail

	Range		Average	Median
	Low	High		
COP (Operations) Per Tap	$ 3.07	$ 19.27	$ 9.15	$ 6.95
COP (Operations) Per Gallon	$ 6.35	$ 61.71	$ 23.25	$ 20.00
COP (Operations) Per Pound	$ 0.57	$ 5.53	$ 2.09	$ 1.79

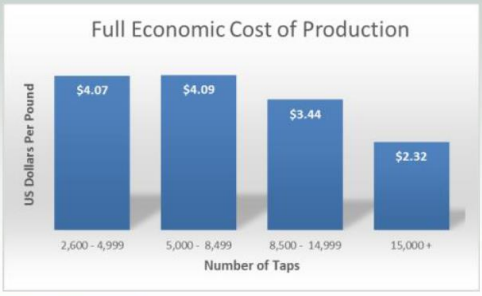
COP with Depreciation

Per Tap	$ 12.04
Per Gallon	$ 30.36
Per Pound	$ 2.72

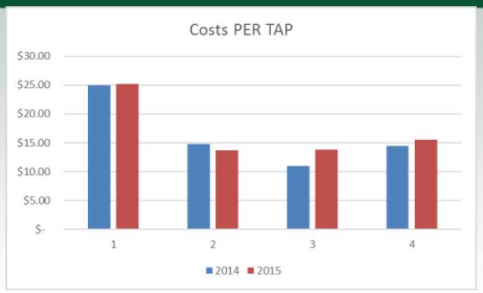
COP with Depreciation: detail

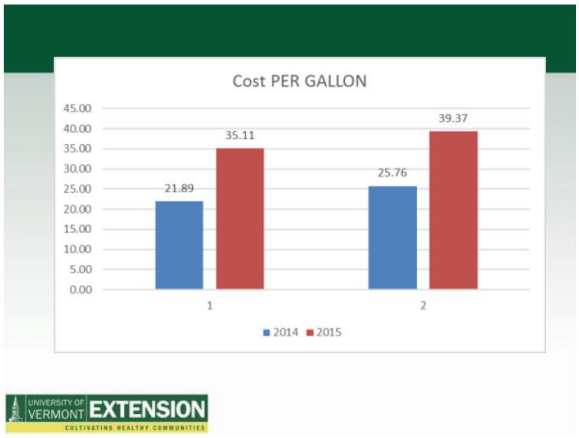
	Range		Average	Median
	Low	High		
COP with Depreciation Per Tap	$ 7.06	$ 22.40	$ 12.04	$ 10.40
COP with Depreciation Per Gallon	$ 14.62	$ 67.62	$ 30.36	$ 28.24
COP with Depreciation Per Pound	$ 1.31	$ 6.06	$ 2.72	$ 2.53

Full Economic Costs



Costs Per Tap





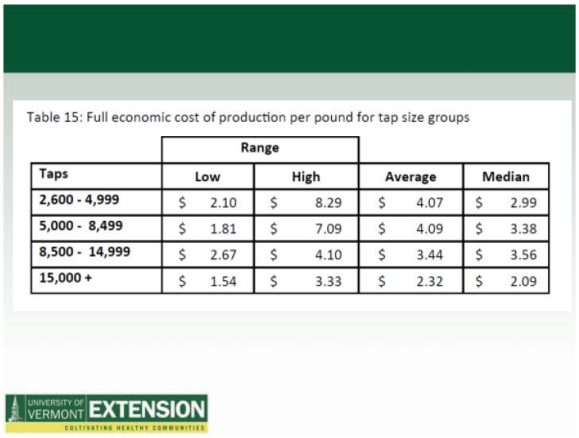


Table 15: Full economic cost of production per pound for tap size groups

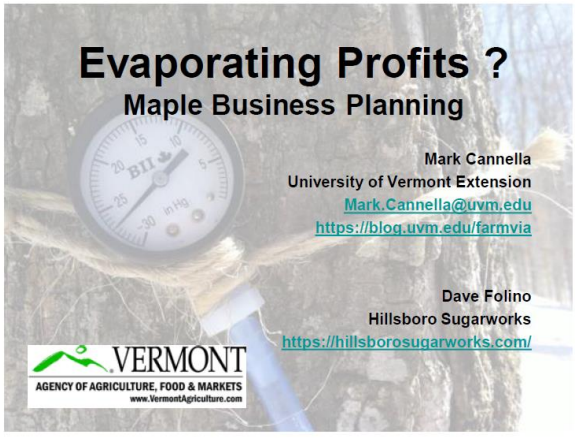
Taps	Range Low	Range High	Average	Median
2,600 - 4,999	$ 2.10	$ 8.29	$ 4.07	$ 2.99
5,000 - 8,499	$ 1.81	$ 7.09	$ 4.09	$ 3.38
8,500 - 14,999	$ 2.67	$ 4.10	$ 3.44	$ 3.56
15,000 +	$ 1.54	$ 3.33	$ 2.32	$ 2.09

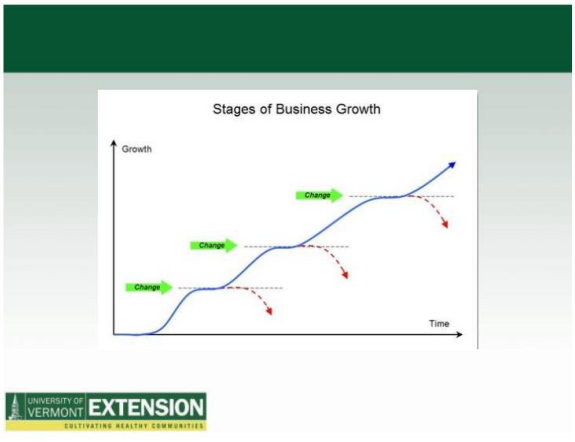
Adaptive Changes

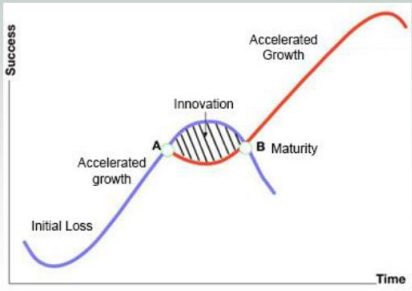
- **Buying Sap !**
- **Seeking New Markets**
- **Direct Market:**
  A) Scaling-Up: COP should be competitive to embark on direct marketing (not the reverse).
  B) "Preservation Mindset"

Adaptive Changes

- Is adding taps always the answer?
- Increase yields from current taps
- Invest time into more marketing







Opportunity Cost

- Identify what you give up to accomplish something
- Put a measurable value on that cost

The Manager

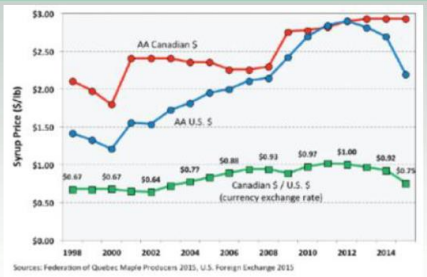
- Critical Skills
  - Production
  - Marketing
  - Management

"What you measure is what you promote"

Management Measures

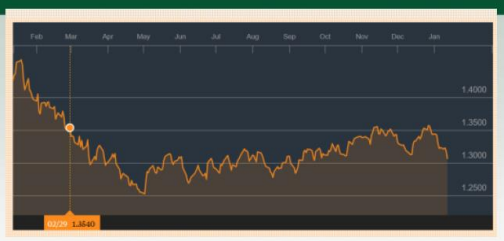
- Production
- Marketing
- Labor
- Investment
- Records

Maple Markets



US – Canadian Currency Exchange Rate, 5 year

www.Bloomberg.com



US – Canadian Currency Exchange Rate , 1 year
www.Bloomberg.com

Maple Markets

- Discuss innovation in new maple products
- Bulk Market Outlook: $2.20 per lb.
- Competition

Marketing Your Crop

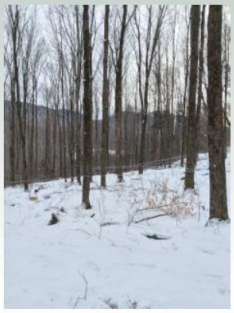
- Significant labor is required to direct market syrup

Table 15: Full economic cost of production per pound fo

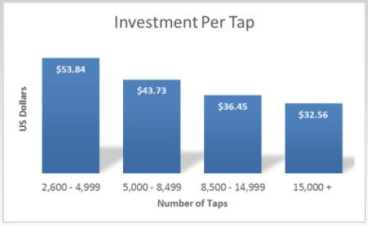
	Range	
Taps	Low	High
2,600 - 4,999	$ 2.10	$ 8.29
5,000 - 8,499	$ 1.81	$ 7.09

Labor Themes

- Owner Labor
- Hired Labor
  - The retention issues
  - The most important skills and training right!



Investment



Investment

- Good investments?
  - They directly increase NET revenue
- Not-so-good investments?
  - Highly depreciable assets

Constraints

- Old Constraints
- New Constraints

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Scaling

What often determines start-up scale?

- Start up Vision
- Easily accessible markets
- Current knowledge base/experience
- The hand you are dealt (land, labor, capital)

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Scaling

What determines scale later on?

- Financial Reality
- Market Dynamics
- Labor Pool
- Creativity!

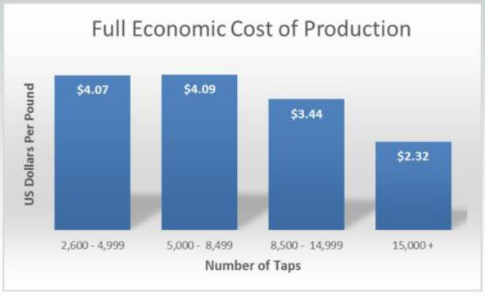
UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Scale and Sweet Spots

- The profit points may be the painful points
- Scenario Sweet Spots
  - 2 owners direct market
  - 2 owners bulk
  - Single owner plus paid employees

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Cost of Production



UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Costs Per Tap

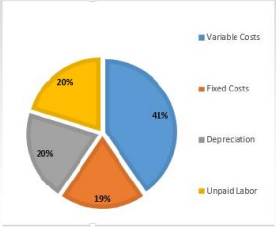
UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

Table 15: Full economic cost of production per pound for tap size groups

Taps	Range Low	Range High	Average	Median
2,600 - 4,999	$ 2.10	$ 8.29	$ 4.07	$ 2.99
5,000 - 8,499	$ 1.81	$ 7.09	$ 4.09	$ 3.38
8,500 - 14,999	$ 2.67	$ 4.10	$ 3.44	$ 3.56
15,000 +	$ 1.54	$ 3.33	$ 2.32	$ 2.09

Non-Cash Items

Unpaid Labor	19 %
Depreciation	20%



Cost of Production

- Legacy Costs
- Dave's thoughts on cost management

Adaptive Changes

- Is adding taps always the answer?
- Increase yields from current taps
- Invest time into more marketing

Project 3: Organic Specialty Crop Cost of Production: Assessment & Education – Final Report

PROJECT SUMMARY

The growth in demand for local foods from consumers has not necessarily translated into profitable markets for Vermont's specialty crop growers, many of whom operate with slim profit margins. Responding to this demand, the supply of local produce has increased, creating competition and limiting price flexibility across market channels. The purpose of this project was to provide New England's organic specialty crop growers with cost of production information for some commonly grown crops and the tools necessary to conduct their own cost of production analysis. At the time the project was proposed, there was no Northeast cost of production data aggregated across farms available but the potential value of that data was clearly articulated by both farmers and service providers. These deliverables allow growers to benchmark themselves against others in our region in order to identify inefficiencies and/or areas for improvement in their production systems, create crop plans that meet their financial goals, and inform market channel selection and pricing, ultimately improving their profitability.

PROJECT APPROACH

Below is an overview of our work during our entire grant period. All activities were completed during the time period noted in the third column. The fourth column contains a brief overview of significant results, accomplishments, conclusions, recommendations and notable developments specific to each activity. More details about these are provided after the table.

Project Activity	**Who did the work?**	**When was the activity accomplished?**	**Overview of significant results & accomplishments**
Funds dispersed		October 1, 2014	
Determine the enterprise crops to focus on. Nine crops will be chosen between the three states (to improve sample sizes and diversity), with each state having six crops to monitor.	Project coordinators, farm advisors, state partners	November 2014	A list of ten crops was developed based on farmer and service provider feedback. Participating farms were given free choice of any of the ten (as opposed to assigning six crops to each state).
Outreach to organic specialty crop growers and service providers about project; advertise to and enroll farmers.	Project coordinator and outreach coordinator	November 2014	Specific selection criteria were set for participating farms: minimum of three acres in production, at least ¼ acre planted of the crops being tracked, and use of mechanical cultivation.
Formalize enterprise analysis template to be used throughout project.	Project coordinator, state partners, and farm advisors	November 2014	Developed workbook. Each new version (three versions total) was improved based on lessons learned using it in the field with farmers.
Initial on-farm visit(s) with farm advisor. Conduct enterprise analysis for current production practices, identify areas for improvement, create plan for tracking in upcoming growing season.	Farm advisors, project coordinator and participating specialty crop farmers	December 2014- March 2015	A total of 13 Vermont farms enrolled in the project, one more than expected. Farm advisors worked with participants to create a plan for tracking data.
Specialty crop growers track relevant data throughout growing season.	Participating specialty crop farmers	April 2015- November 2015	There was a poor rate of completion of the workbooks in the first season with only 5/13 Vermont farms fully completing the workbook. Massachusetts had similar issues with completion in year one.
On-farm visits to conduct second enterprise analysis to compare profitability after trialing improvement strategies. Create plans for	Farm advisors, project coordinator and	November 2015- March 2016	Since the majority of farms did not have a completed workbook, this winter was used to improve the workbook and conduct farm visits to address issues and set the

upcoming season and gather feedback on enterprise process to inform future projects.	participating specialty crop farmers		farmers up for a successful season of tracking in 2016.
Specialty crop growers track relevant data throughout growing season.	Participating specialty crop farmers	April 2016-November 2016	11/12 Vermont farms completed workbooks during the 2016 season. (One farm stopped participating, returning the total to 30 farms.)
Gather completed enterprise analysis from specialty crop farmers to inform fact sheets; identify potential field day hosts.	Project coordinator	January 2017-February 2017	All data was gathered by early January 2017.
Plan & present 2-4 winter conference workshops to focus on profitability strategies and enterprise analysis.	Project coordinator, state partners	December 2016-February 2017	Initial data analysis results were presented at the Vermont Vegetable and Berry Growers Association (VVBGA) Annual Meeting and the NOFA-VT Winter Conference.
Create and administer survey farmer participants about data collection and technical assistance received	Project coordinator, farm advisors	December 2016- February 2017	This activity was added when we realized how important it was to determine whether the farmers we were working with saw value in these services.
Six month project extension granted. New project end date of 9/29/17.			
Plan on-farm field days to focus on profitability strategies for specialty crop growers.	Project coordinator	March 2017-April 2017	Planned two on-farm field days to focus on profitability strategies for specialty crop growers.
Compile information and complete specialty crop fact sheets to be ready for distribution at field days.	Project coordinator, state partners, and farm advisors.	April 2017-August 2017	Completed eight factsheets: five crop-specific cost of production (COP) factsheets (carrots, potatoes, winter squash, onions, lettuce), a crop comparison sheet, tips for tracking COP, and whole farm financial ratios.
Deliver at least 2-4 on farm field days. Collect participants contact information for later evaluation.	Participating specialty crop farmers, other specialty crop growers, and/or farm advisors	July 2017-September 2017	Hosted a production efficiency workshop at Hurricane Flats Farm and a harvest efficiency workshop at Jericho Settlers Farm. Both workshops examined production practices and COP project results.
Create evaluation survey to administer post-field day	Project coordinator	July 2017 - September 2017	Evaluation survey created and administered.

and/or workshop. Survey winter conference and summer workshop participants to evaluate impact.			
Evaluate project activities and submit final report.	Project coordinator, state partners	October 2017	Final report submitted October 2017.

Cost of Production Workbook

The development of this workbook, now available as a tool for farmers and service providers, was a significant accomplishment of this project. Many farmers run enterprise analyses and end up with a gross profit figure; this workbook incorporates the full costs of production into each crop budget, including marketing and overhead expenses. We found that adding in a "critical ratios of production" page that auto-populated each rate on a per acre basis for each crop budget was valuable for not only the farmers completing workbooks but for ease of aggregation of the data across farms.

Data Collection & Technical Assistance

One thing that the project team did not anticipate was the difficulty in collecting good quality data, even from experienced farmers. We did not end up with two seasons of data from all 12 of our farmers as we had originally planned. The lessons learned from a low rate of workbook completion (5/13 Vermont farmers) during the 2015 season informed our approach in 2016. The changes made to data collection and technical assistance in 2016 increased our completion rate to 11/13 Vermont farmers. Tangible changes made to our data collection approach included: further refinement of the workbook, more frequent check-ins throughout the season, focusing on recording rates of work, and suggestions for involving the crew in data collection and for integrating the activity into the existing production systems. Overall, the farmers involved expressed that they valued both the cost of production analysis and the time talking through their business with a farm advisor.

Specialty Crop Fact Sheets

After the 2016 season, we had enough aggregated data to generate five crop-specific factsheets focused on carrots, onions, potatoes, winter squash, and lettuce. Our initial plan was to have nine crop-specific factsheets but, due to the fact that we gave farmers a choice to track between one and three of the crops on a list of ten, there was not enough data on the other five crops with which to create a factsheet. This was a tricky line to straddle as we wanted participation to be self-directed and useful to farmers but also wanted robust aggregated data as an outcome. When creating the factsheets, we found it useful to present low, high, and average numbers for our critical ratios. To supplement that data, we also constructing pie charts illustrating the average hours (by number and percent) spent to complete the major steps in the crop production process. The other three factsheets offer: a comparison of key crop-specific metrics, tips for conducting cost of production analysis, and whole farm financial ratios. The latter was a bonus result of the project that we had not anticipated; the workbook had a spot for some macro financial information and we realized that we had financial data from 27 of the participating farms to present as an additional business management metric. This is our most robust data sheet and has been identified by farmers as delivering high value.

Cost of Production Workshops

In Vermont, there were nine crop specific production workshops held on during 2015 and 2016, three more than originally planned. In 2015, our focus for two workshops was on production efficiency for specific crops as there were not yet cost of production results to present. After our successful season of data collection in 2016, we presented the initial aggregation of Vermont data during four events in the

winter of 2017 and then the final data set during two summer on-farm workshops and a webinar for beginning farmer service providers. Our 2017 on-farm workshops were hosted by farmers who had participated in the data collection and we paired a focus on production and harvest efficiency of some crops featured in the factsheets. It was an effective delivery method to see cost-saving techniques in action, discuss cost of production analysis, and send attendees home with real numbers and a tool to use in their production and business planning processes.

Project Partners

At the state level, NOFA-VT partnered with two key farm advisors, Richard Wiswall and Mimi Arnstein, and both were instrumental in the success of our project. Richard Wiswall developed the cost of production workbook, building upon some of the spreadsheets from his book (*The Organic Farmer's Business Handbook*) and feedback from the project team to logically link data sheets together, integrate text and examples for users, and develop additional features to streamline the aggregation of data. Both Richard and Mimi then worked one-on-one with participating farmers, orienting farmers to the workbook, collecting data, and providing technical assistance. Each assisted with factsheet development by truth-testing results, identifying trends, and suggesting effective factsheet designs. Mimi and Richard co-hosted the on-farm workshops we had this summer, providing context and facilitating conversations linking what farmers were showing us to the cost of production project.

At the project level, NOFA-VT partnered with NOFA-MA and NOFA-NH after those organizations were simultaneously awarded SCBG cost of production grants. NOFA-VT served as the project lead. We collaborated with our partners on project design, data collection strategies, outreach efforts, and factsheet compilation. It was beneficial to hear about the similarities and differences between participating farms and data collection and technical assistance strategies across three states. Had this not been a multi-state project, the data would have been much less robust or we would have had to impose more restrictions on the crops farmers focused on in order to aggregate data. Our multi-state collaboration also increased awareness about the project and will hopefully provide additional traction for more farmers using the cost of production workbook going forward.

GOALS AND OUTCOMES ACHIEVED

The following table highlights our project goals and accomplishments.

PROJECT GOALS	PROJECT ACCOMPLISHMENTS	NOTES
Increase the efficiency of production and profitability of specialty crops. Gather benchmark data to inform further study on organic specialty crops in the Northeast.	Created cost of production workbook that is available as a tool for farmers to increase the production efficiency and profitability of specialty crops. Aggregated benchmark data on five specialty crops.	This project informed NOFA's new SCBG, through which we are continuing our cost of production technical assistance and crop benchmarking work.
Support 12 Vermont, 9 Massachusetts, and 9 New Hampshire organic specialty crop farmers in using cost of production analysis.	Supported 12 Vermont, 8 Massachusetts, and 10 New Hampshire organic specialty crop farmers in using cost of production analysis.	Vermont initially enrolled 13 farmers in the project. One farmer did not follow through with any notable level of project engagement. 12 Vermont farmers (goal), 10 New Hampshire farmers (one more

		than goal), 8 Massachusetts farmers (1 less than goal)
Create fact sheets for nine specialty crops.	Created eight factsheets. Five were for specific crops: potatoes, onions, carrots, winter squash, and lettuce. The other three factsheets focus on: crop profitability comparisons, tips for completing cost of production analysis, and whole farm financial ratios.	Due to the crops each farmer selected and some farms whose practices were not scalable, we only had enough aggregated data for five crops. The other three factsheets have been very well received.
Host six workshops/field days (each state planned to host six) to share successful production practices and cost of production information	Hosted nine workshops/field days in Vermont from 2016-2017.	Included: presentations at VVBGA Annual Meeting, VVBGA Cover Crop Day, NOFA-VT Winter Conference, Strawberry School workshop, Beginning Farmer Learning Network Webinar, & 4 on-farm workshops
Utilize a regional partnership between NOFA-VT, NOFA-MA, and NOFA-NH to efficiently share resources and information for the benefit of regional growers who face similar climate and market constraints.	Established an effective, collaborative partnership with NOFA-MA and NOFA-NH. Saw tangible project benefits during both implementation and outreach phases.	

The following table compares the expected measurable outcomes of our project with the actual outcomes of our efforts.

EXPECTED MEASURABLE OUTCOME	**ACTUAL OUTCOME**	**NOTES**
Support 30 specialty crop farmers in utilizing cost of production analysis to track and assess profitability of nine key specialty crops; measured by the number of multi-year enterprise analysis created with technical assistance consultants.	30 specialty crop farmers completed 63 crop budgets analyzing 18 different specialty crops.	Participating farmers were surveyed about their experience with this project. -68% were surprised by the results after completing the workbook -79% indicated that the workbook analysis provided them with information that will impact their business and/or decisions -58% plan to use the workbook for other crops

		in future season (and 37% indicated they might use it again)
Work with specialty crop growers to develop fact sheets about production factors and market considerations affecting profitability for nine specialty crops.	Eight factsheets developed that provide farmers and service providers with information about: crop production & profitability, market considerations, best practices for cost of production analysis	As of the end of September, 185 copies of the factsheets had been distributed in paper form at workshops and meetings and are now available as web-based resources.
Increase profitability of nine specialty crops among beginning and established farmers by sharing production strategies at 18 workshops, attended by at least 20 participants each. At least 20% of attendees will make production changes that will increase the profitability and competitiveness of specialty crops.	Attendance at Vermont's nine workshops was highly variable, depending on the event: - Organic High Tunnel Tomatoes at Cedar Circle Farm (19) - Healthy Brassicas at Clear Brook Farm (12) -VVBGA 2017 Annual Meeting (around 200) - VVBGA 2017 Cover Crop Day (about 100) - NOFA-VT 2017 Winter Conference (20) - Strawberry School (36) - Organic Vegetable Cost of Production: Beginning Farmer Learning Network Webinar (35 live attendees) - Production Efficiency at Hurricane Flats (13) - Harvest Efficiency at Jericho Settlers (9)	Attendees at the three in-person NOFA-VT workshops in which the cost of production results were integrated into the workshop were surveyed this fall. -44% of attendees said they will make a change to their production system -100% of attendees indicated that they left the workshop with ideas that could make their farm more profitable

The economic impact of this project is a long-term outcome measure. At the start of the project, each participating farm selected crops that they wanted more information on, many had marginal or unrealized profit. After completing the workbook during the 2016 season and analyzing their data compared to other participants', thirty farms in the three states are in a position to make changes that positively increase their profitability. Meeting with a farm advisor catalyzed these farmers' examinations of the three key factors impacting profitability – yields, sales price, and production expenses, with special attention paid to the cost of labor. Presenting the cost of production results in many different critical ratios allows farmers to dive deep and pinpoint specific areas of inefficiency. Many farmers participating in the project were surprised and/or encouraged by the results and immediately started the conversation with their farm advisor about possible adjustments to make next season. It can be assumed that if those changes deliver the projected results, many of the participating farmers will realize improved profitability in the next few years; if a significant investment is required to become more efficient, it follows that there will be a delay before net profit improves.

We have been distributing the workbook upon request, after each workshop, and to our service provider network. After more farms across the Northeast begin implementing the workbook, the economic impact will only be magnified each season.

BENEFICIARIES

The groups that benefited from the implementation and completion of this project include:

- 30 organic specialty crop growers in Vermont, New Hampshire, and Massachusetts who participated in the project
- 409 specialty crop growers who attended a presentation or workshop about the project presented by a Vermont farm advisor or NOFA-VT staff member
- 35 service providers who attended a webinar sharing project results

At the completion of the project, a press release was circulated to many different Northeast partner organizations and national agricultural publications. The workbook has been sent to all workshop and webinar participants and many of our partner organizations, who have posted it and shared it with their farmers along with the factsheets. Though the exact economic impact of this project cannot be measured (for the reasons discussed above and because the results are being shared so widely), the potential economic impact is significant. These tools set farmers up to capture critical data, analyze their profitability, and make targeted efficiency improvements to their least profitable production activities. The aggregated data contained in the factsheets allows for further fine-tuning; not only are they looking critically at their own farm year-to-year but have numbers to reference to see if they are in the ballpark or if an area is ripe for an efficiency improvement. If one farm that grosses $150,000 uses our tools and makes improvements to their production system that increases their sales by 5%, that one farm increases their revenue by $7,500. Extrapolated out to each farm that received the workbook, the potential economic impact of this project is quite significant.

LESSONS LEARNED

There were two major lessons learned and one unexpected outcome as a result of implementing and completing this project. The lessons learned were:

1. Data collection was more challenging than expected. As discussed above, we planned to have two full seasons of data collected to aggregate into factsheets but only ended up with one full season for use. Despite all of the farmers involved knowing that detailed record-keeping is critical to farm success, many still had trouble working it into their systems and making time for it during the season. We discovered some of the farmer participants were naturally inclined towards this level of record keeping and data analysis, while others required more frequent check-in's and reminders to get the bare minimum done. We would definitely recommend the approach we eventually used for data collection; pairing technical assistance visits with data reminders multiple times over the course of the season was seen as valuable by all farmers and definitely contributed to the success of the data collection process.
2. The project design with three different organizations funded through three separate grants was both invaluable and challenging. Collecting data from 30 farms needed to be a collaborative effort and each partner approached their grant slightly differently which added value on our planning calls. The challenge came because the slight differences in our project approaches meant that not all farms met the same criteria for participation (minimum of 3 acres in production, minimum of ¼ of the crop planted, use of mechanical cultivation, certified organic). Many farms in Massachusetts and some in New Hampshire were smaller and, upon compiling data, it became apparent that not all of their numbers made sense when scaled up to a per acre basis. Massachusetts and New Hampshire farmers were also not held as strictly to the list of ten crops to select to track and many chose outside of the list. Had we all been under one grant, farms in each state would have met the same criteria and selected crops from the same list. This would likely have increased the amount of data we had to aggregate and improved the robustness and number of the crop-specific factsheets created.

The unexpected outcome was that the collection of whole farm financial ratios from 27 of the farms in the project. That information was included in the workbook but until we started aggregating data, we did not realize that this could be a project outcome as well. As a bonus, it happened that this whole farm data could be split into almost perfect tertiles by gross sales, providing farms with valuable macro farm financial metrics to benchmark themselves against.

CONTACT PERSON

Jen Miller, NOFA-VT Farmer Services Coordinator | jen@nofavt.org | 802-434-4122 x14

ADDITIONAL INFORMATION

The following tools, resources, presentations, publications, and we page were developed as a result of SCBGP funds. Photos from the 2017 workshops are also included.

Tools & Resources

NOFA Cost of Production Workbook (Excel spreadsheets)

Eight factsheets (PDFs)

- Carrots
- Lettuce
- Onions
- Potatoes
- Winter squash
- Crop Comparison
- Tips for Tracking Costs of Production
- Whole Farm Financial Ratios

Webpage

These factsheets and the workbook can be accessed through NOFA-VT's website at https://www.nofavt.org/cost-of-production.

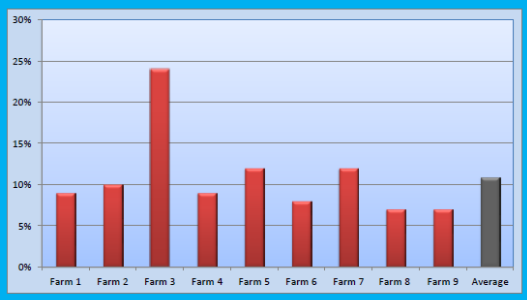
Presentations

NOFA-VT Cost of Production Project – presented by Richard Wiswall at 2017 VVBGA Annual Meeting (January 2017)

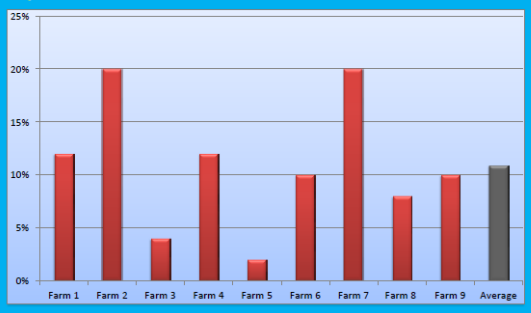
Crop selection

- Crops important to New England
- Carrots, onions, potatoes, head lettuce, salad greens, garlic, strawberries, greenhouse tomatoes, kale, winter squash
- Each crop grown by multiple farms, in different states

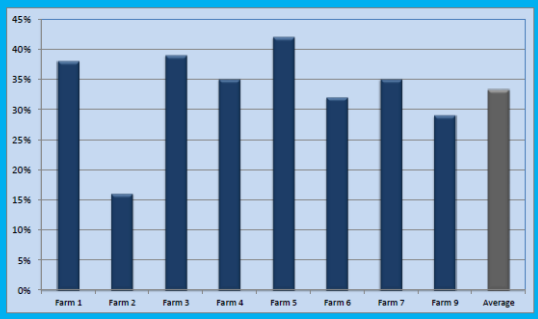
Overhead Expenses as a percent of Farm's Gross Sales



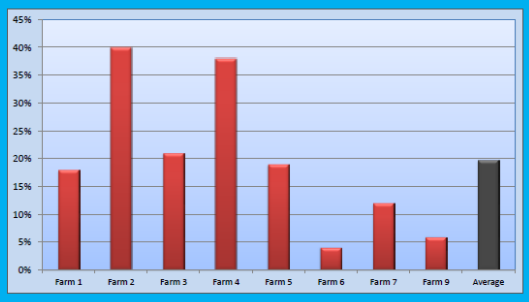
Marketing Expenses as a percent of Farm's Gross Sales



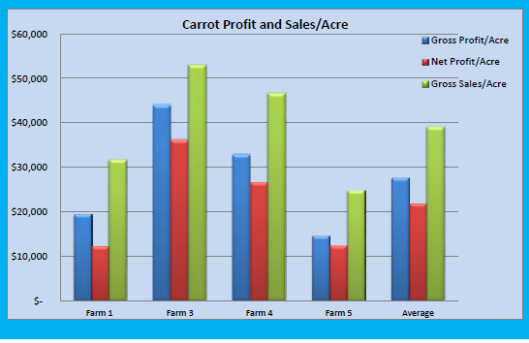
Paid Labor as a percent of Gross Sales



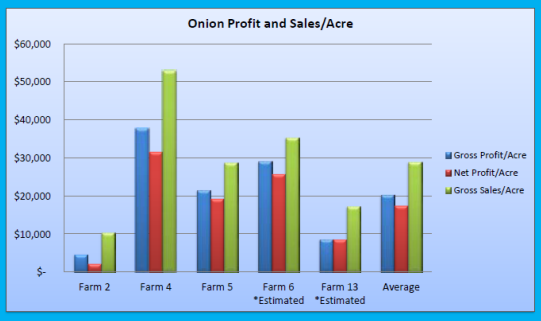
Income Ratio: Net Profit as a percent of Gross Sales



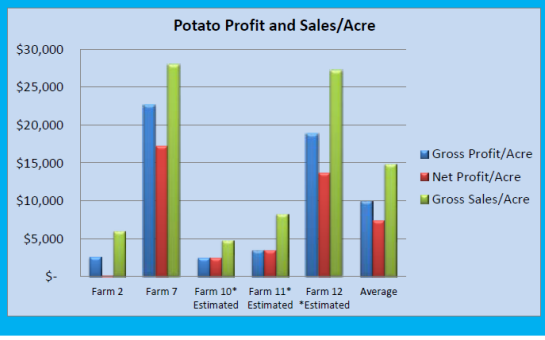
Gross Sales, Gross Profit, and Net Profit for Carrots



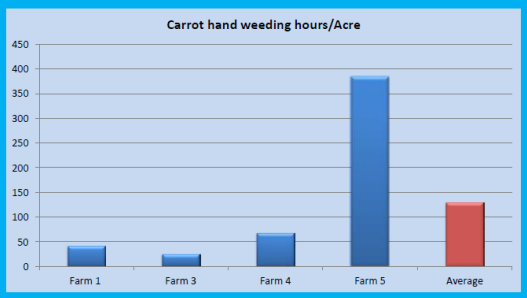
Gross Sales, Gross Profit, and Net Profit for Onions



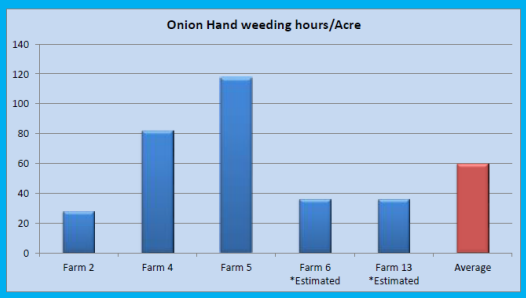
Gross Sales, Gross Profit, and Net Profit for Potatoes



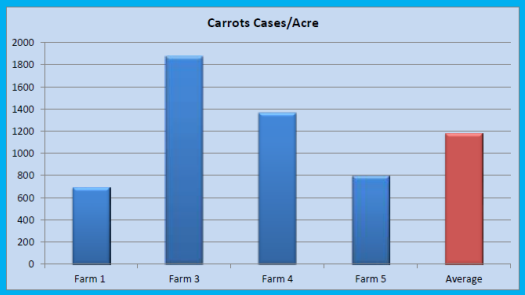
Hand weeding Hours per Acre for Carrots



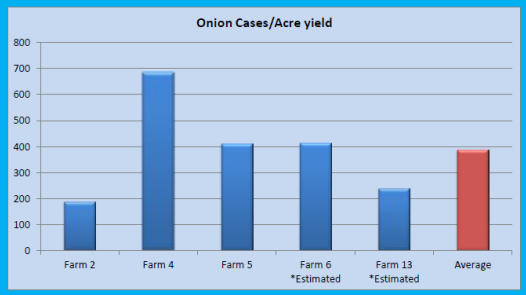
Hand weeding Hours per Acre for Onions

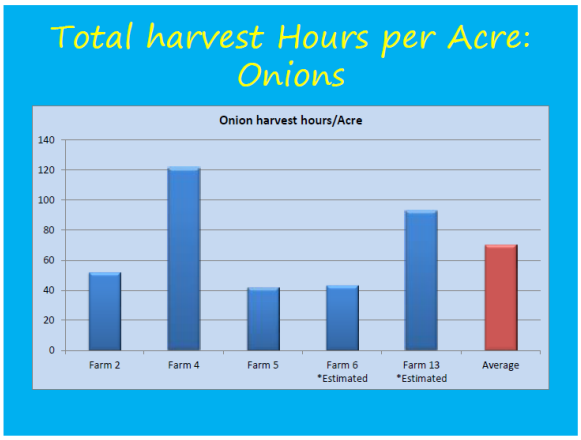


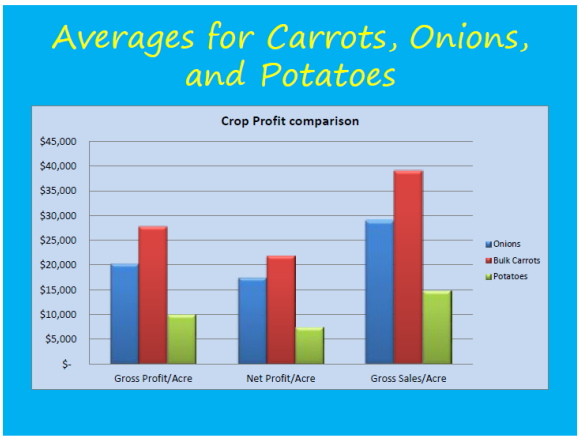
Yield: 25 lb Carrots per Acre (all grades combined)



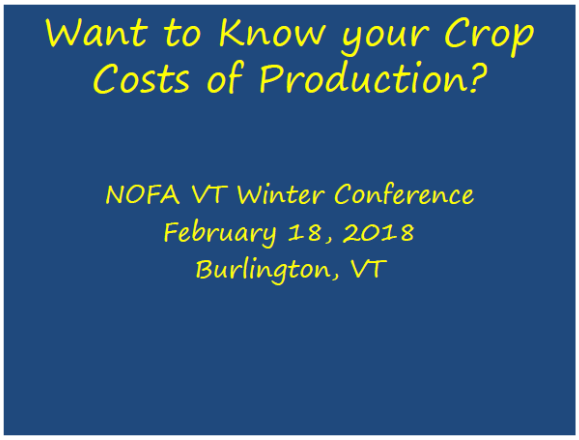
Yield: 50 lb Onions per Acre (all grades combined)

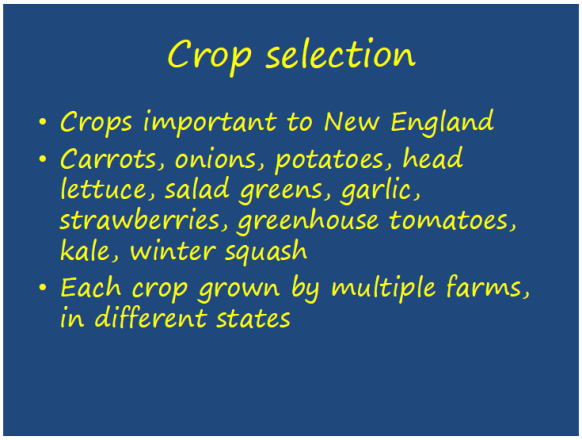






Want to Know Your Crop Costs of Production? - presented by Richard Wiswall & Mimi Arnstein at 2017 Winter Conference (February 2017)



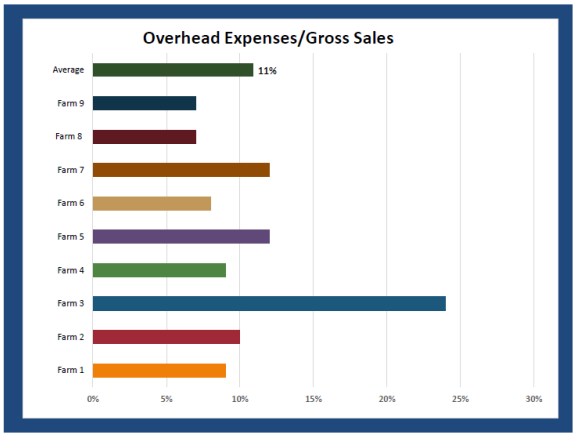


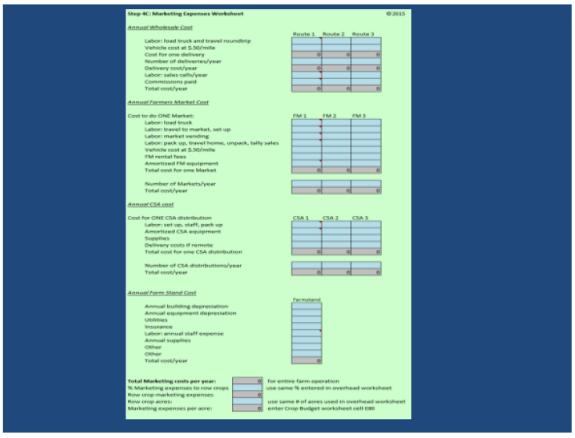
Definitions

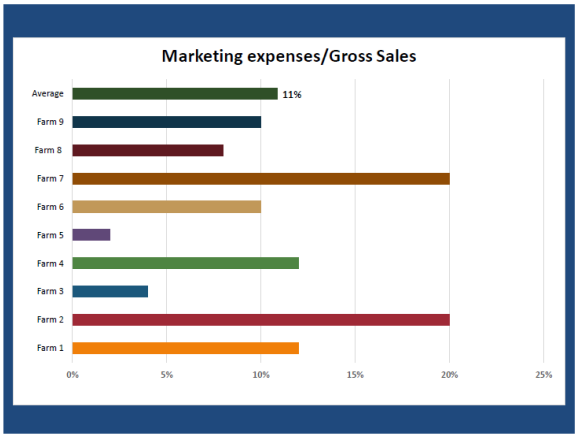
- Gross Sales
- Variable and 'Fixed' Costs
- Gross Profit
- Overhead and Marketing Costs
- Net Profit

Overhead Expenses

Item	Annual cost	
Advertising		
Donations		*paid* donations, not crop donations
Electricity: farm %		
Insurance: farm %		not Workers Comp: already included in Labor rate
Interest expense: farm %		for operating loans; not for mortgage, or tractor or implements previously listed
Landfill		
Office		
Professional services		
Property taxes: farm %		
Rented land		
Telephone: farm %		
Travel/conferences		
Supplies		For costs not in crop budgets, like small tools, hoses, hoes, or harvest baskets
Website, internet		
Cover crop expenses		Cover crops used in rotation with row crops such as fallow fields
Miscellaneous		For costs not in crop budgets, like infrastructure maintenance
Total overhead expenses	$0	for entire farm operation
% OH expenses to row crops		Enter 100% unless non-row crop sales (i.e. livestock) is more than 20% of gross, then use row sales:gross sal
Row crop overhead expenses	$0	
Row crop acres:		row cropped acreage, including cover crops in rotation
Allocation of overhead expenses/A:	0 per acre	to enter in Crop Budget worksheet cell E79





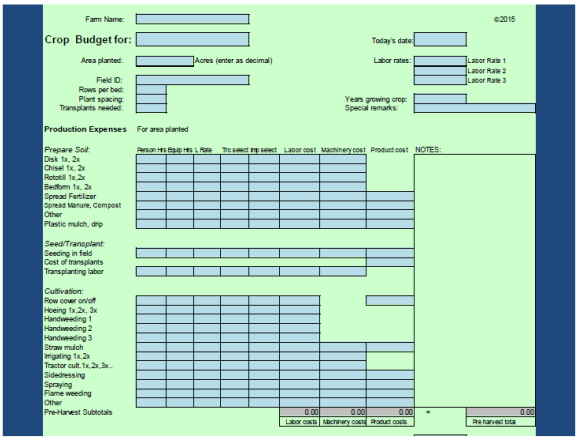


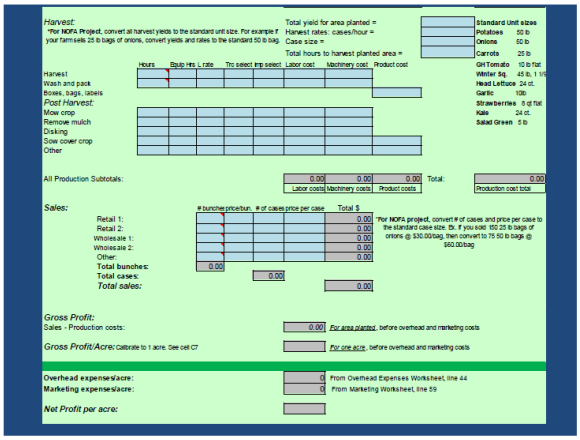
Sample tractor costs/hour

	Tractor 1	Tractor 2	Tractor 3
Model:	JD 5303	Ford 4000	Cub
Purchase price, (or use FMV)	27500	6000	3500
Resale value after 10 years	19500	4000	3000
Annual cost of ownership	800	200	50
Average annual repairs	150	300	250
Average annual fuel cost	180	120	70
Annual interest expense			
TOTAL Annual Cost	1130	620	370
Hours used per year	200	200	60
Cost per hour (without operato	5.65	3.10	6.17

Sample Implement costs per hour

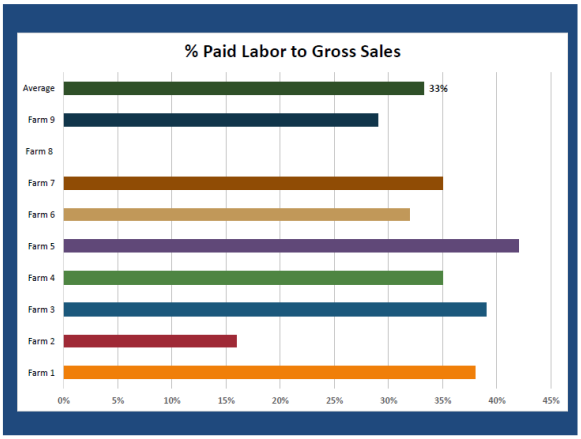
Tool name:	Tool 1 Disk	Tool 2 Bushog	Tool 3 Undercutter	Tool 4 Manure Spr.
FMV now	$1,200.00	$1,400.00	$800.00	$1,900.00
FMV in 10 years	$800.00	$900.00	$700.00	$800.00
Difference	$400.00	$500.00	$100.00	$1,100.00
Divide by 10 years to get				
Annual ownership cost	$40.00	$50.00	$10.00	$110.00
Annual average repairs	$40.00	$20.00	$0.00	$50.00
Annual loan payments				
Total annual costs	$80.00	$70.00	$10.00	$160.00
Hours used/year	25	20	20	15
Cost/hour	3.20	3.50	0.50	10.67

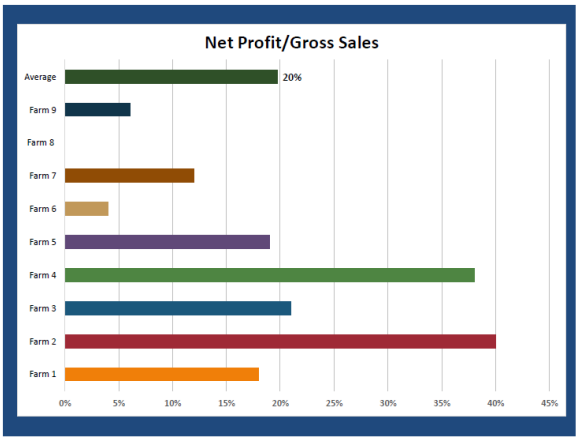


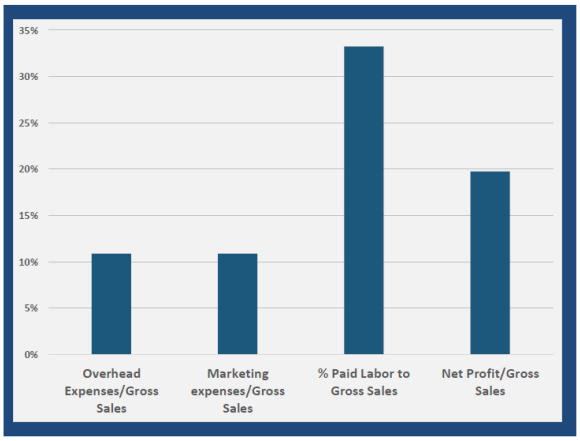


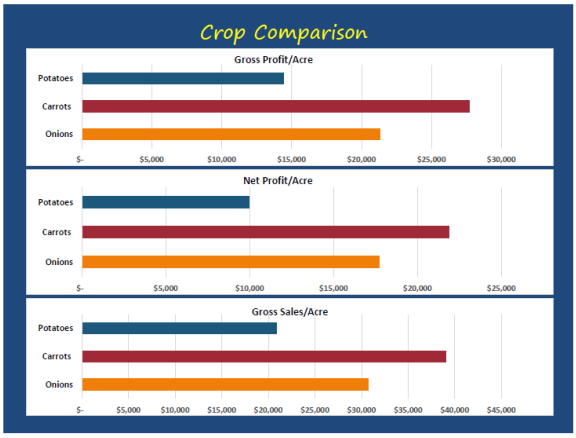
Critical Ratios of Production

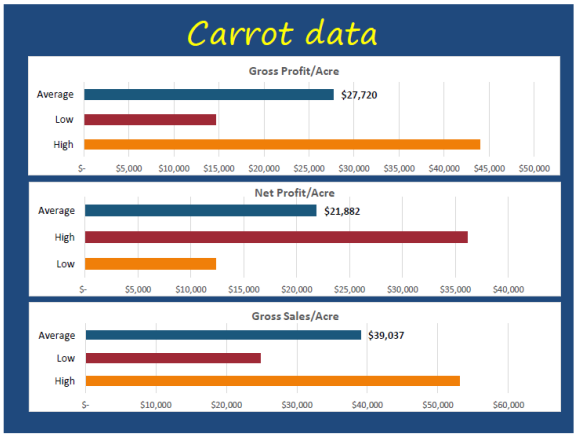
	Onions	Carrots	Potatoes
Gross Profit/Acre	$ 21,312	$ 27,720	$ 14,433
Net Profit/Acre	$ 17,720	$ 21,882	$ 9,981
Cases/Acre yield	429	1184	298
Gross Sales/Acre	$ 30,711	$ 39,037	$ 20,850
Avg. Price per Case	$ 74	$ 36	$ 73
Bed Prep cost/Acre	$ 983	$ 746	$ 752
Seeding cost/acre	$ 227	$ 235	$ 857
Transplant costs (including labor)/Acre	$ 3,544		$ 1,275
Handweeding hours/Acre	76	130	3
All Cultivation cost/Acre	$ 1,777	$ 2,549	$ 691
Cases harvested/hour	6	12	4
Total harvest hours/Acre	72	322	77
Cases washed and packed/Hour	5	10	5
Total wash and pack hours/Acre	121	132	85
Post Harvest Costs/Acre	$ 117	$ 495	$ 224

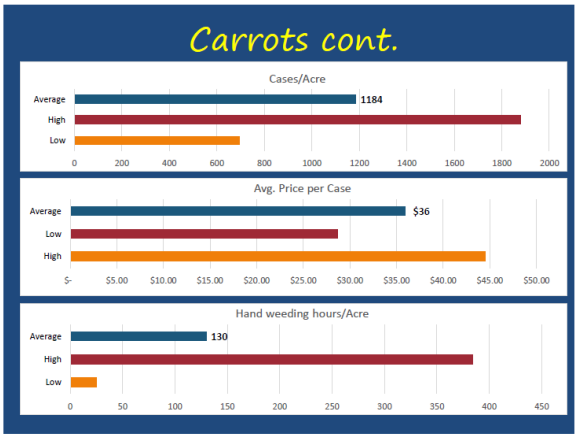


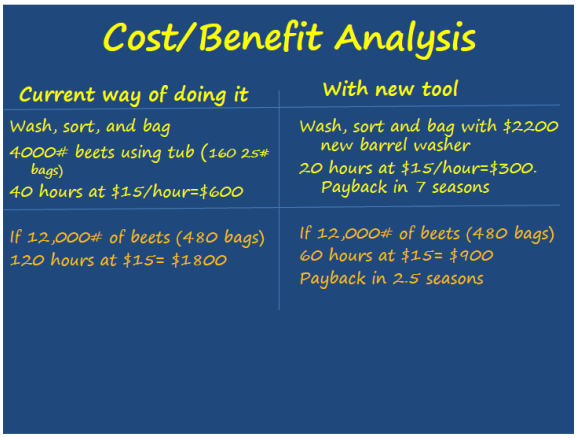

Net Profit/Gross Sales
Average
Farm 9
Farm 8
Farm 7
Farm 6
Farm 5
Farm 4
Farm 3
Farm 2
Farm 1
20%
0% 5% 10% 15% 20% 25% 30% 35% 40% 45%


35%
30%
25%
20%
15%
10%
5%
0%
Overhead Expenses/Gross Sales
Marketing expenses/Gross Sales
% Paid Labor to Gross Sales
Net Profit/Gross Sales


Crop Comparison
Gross Profit/Acre
Potatoes
Carrots
Onions
$- $5,000 $10,000 $15,000 $20,000 $25,000 $30,000
Net Profit/Acre
Potatoes
Carrots
Onions
$- $5,000 $10,000 $15,000 $20,000 $25,000
Gross Sales/Acre
Potatoes
Carrots
Onions
$- $5,000 $10,000 $15,000 $20,000 $25,000 $30,000 $35,000 $40,000 $45,000


Carrot data
Gross Profit/Acre
Average
Low
High
$27,720
$- $5,000 $10,000 $15,000 $20,000 $25,000 $30,000 $35,000 $40,000 $45,000 $50,000
Net Profit/Acre
Average
High
Low
$21,882
$- $5,000 $10,000 $15,000 $20,000 $25,000 $30,000 $35,000 $40,000
Gross Sales/Acre
Average
Low
High
$39,037
$- $10,000 $20,000 $30,000 $40,000 $50,000 $60,000


Carrots cont.
Cases/Acre
Average
High
Low
1184
0 200 400 600 800 1000 1200 1400 1600 1800 2000
Avg. Price per Case
Average
Low
High
$36
$- $5.00 $10.00 $15.00 $20.00 $25.00 $30.00 $35.00 $40.00 $45.00 $50.00
Hand weeding hours/Acre
Average
High
Low
130
0 50 100 150 200 250 300 350 400 450


Cost/Benefit Analysis
Current way of doing it
Wash, sort, and bag
4000# beets using tub (160 25# bags)
40 hours at $15/hour=$600
If 12,000# of beets (480 bags)
120 hours at $15= $1800
With new tool
Wash, sort and bag with $2200 new barrel washer
20 hours at $15/hour=$300.
Payback in 7 seasons
If 12,000# of beets (480 bags)
60 hours at $15= $900
Payback in 2.5 seasons

Organic Specialty Crop Cost of Production - presented by Jen Miller as a Beginning Farmer Learning Network Webinar (August 2017 - PowerPoint below, webinar at http://smallfarms.cornell.edu/resources/webinars/webinars-for-service-providers)

ORGANIC SPECIALTY CROP COST OF PRODUCTION

Jen Miller, NOFA-VT
BFLN Webinar
August 2017

COST OF PRODUCTION WEBINAR

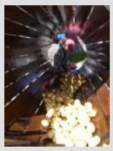
- Introductions
- NOFA Project Overview
- Cost of Production Workbook
- Project Results & Application to Farm Profitability
- Best Practices for COP Data Collection & Analysis
- Wrap-up Q & A

WHY DO COST OF PRODUCTION ANALYSIS?

- Set informed prices
- Select market channels
- Refine production systems & increase efficiency
- Decide on acreage (total and per crop)
- Measure the impact of changing your systems
- Maximize profit margins

NOFA COST OF PRODUCTION PROJECT

- 2014 Specialty Crop Block Grant
  - NOFA-VT, NOFA-MA, NOFA-NH



- Project Goals:
  - Provide business TA for farms
  - Share costs of production with other farmers, enabling cross-farm comparison
  - Determine the feasibility of selling to different markets

NOFA COST OF PRODUCTION PROJECT

- 30 farms in VT, NH, MA (12 in VT)
- Criteria for Participating Farms (VT)
  - Minimum 3 acres in production
  - Minimum 1/4 acre of crop
  - Mechanical cultivation
  - Certified organic

- Each farm chose 2-3 crops to track from a list of 10 crops
  - Important crops for New England farms
  - Thought to be feasible across multiple market channels

NOFA COST OF PRODUCTION PROJECT

CROPS

- Carrots*
- Onions*
- Potatoes*
- Head Lettuce*
- Winter Squash*
- Salad greens
- Garlic
- Greenhouse tomatoes
- Kale
- Strawberries

Data Collection

- 2015 - COP workbook piloted
  - 4/12 farms in VT completed data collection, similar in MA
- 2016 – Revamped COP workbook & approach
  - 11/12 VT farms had fully completed workbook
  - 28/30 farms in project had fully completed workbooks

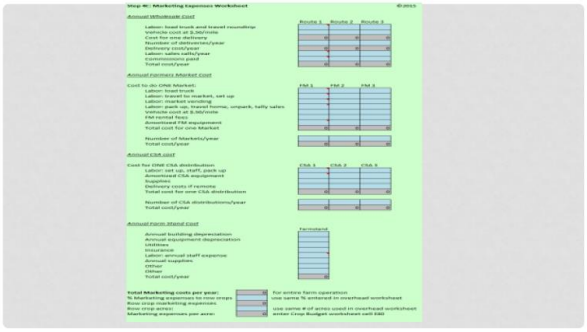
COP WORKBOOK

DEFINITIONS

- Gross sales
- Variable Costs
- Fixed/Overhead Costs
- Marketing Costs
- Gross Profit
- Net Profit

OVERHEAD EXPENSES

Item	Annual cost	
Advertising		
Donations		*paid* donations, not crop donations
Electricity: farm %		
Insurance: farm %		not Workers Comp: already included in Labor rate
Interest expense: farm %		for operating loans; not for mortgage, or tractor or implements previously listed
Landfill		
Office		
Professional services		
Property taxes: farm %		
Rented land		
Telephone: farm %		
Travel/conferences		
Supplies		For costs not in crop budgets, like small tools, hoses, hoes, or harvest baskets
Website, internet		
Cover crop expenses		Cover crops used in rotation with row crops such as fallow fields
Miscellaneous		For costs not in crop budgets, like infrastructure maintenance
Total overhead expenses	$0	for entire farm operation
% OH expenses to row crops		Enter 100% unless non-row crop sales (i.e. livestock) is more than 20% of gross, then use row sales/gross sal
Row crop overhead expenses	$0	
Row crop acres:		row cropped acreage, including cover crops in rotation
Allocation of overhead expenses/A:	0 per acre	to enter in Crop Budget worksheet cell E79

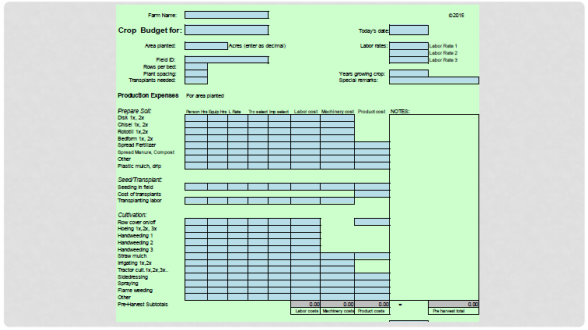


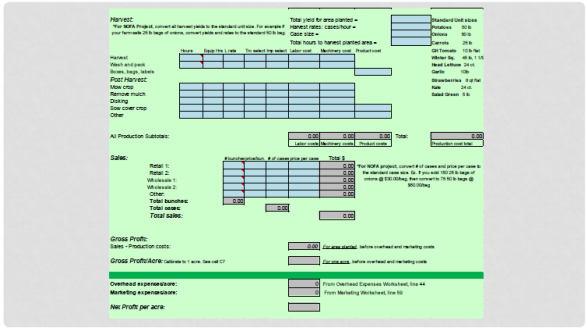
TRACTOR COSTS/HOUR (SAMPLE)

Model:	Tractor 1 JD 5303	Tractor 2 Ford 4000	Tractor 3 Cub
Purchase price, (or use FMV)	27500	6000	3500
Resale value after 10 years	19500	4000	3000
Annual cost of ownership	800	200	50
Average annual repairs	150	300	250
Average annual fuel cost	180	120	70
Annual interest expense			
TOTAL Annual Cost	1130	620	370
Hours used per year	200	200	60
Cost per hour (without operato	5.65	3.10	6.17

IMPLEMENT COSTS/HOUR (SAMPLE)

Tool name:	Tool 1 Disk	Tool 2 Bushog	Tool 3 Undercutter	Tool 4 Manure Spr.
FMV now	$1,200.00	$1,400.00	$800.00	$1,900.00
FMV in 10 years	$800.00	$900.00	$700.00	$800.00
Difference	$400.00	$500.00	$100.00	$1,100.00
Divide by 10 years to get				
Annual ownership cost	$40.00	$50.00	$10.00	$110.00
Annual average repairs	$40.00	$20.00	$0.00	$50.00
Annual loan payments				
Total annual costs	$80.00	$70.00	$10.00	$160.00
Hours used/year	25	20	20	15
Cost/hour	3.20	3.50	0.50	10.67





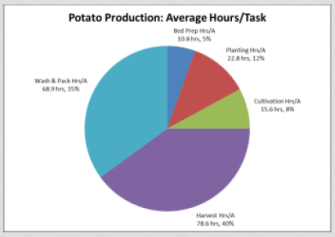
CRITICAL RATIOS OF PRODUCTION

- Gross Sales/Acre
- Gross Profit/Acre
- Net Profit/Acre
- Cases/Acre
- Average Price/Case
- Hand weeding Hours/Acre
- All Cultivation Costs/Acre
- Cases Harvested/Hour
- Total Harvest Hours/Acre
- Cases Washed & Packed/Hour
- Total Wash & Pack Hours/Acre

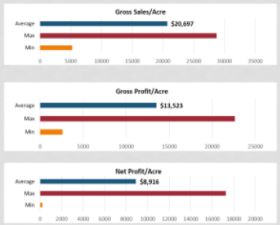
And not to be forgotten...

- Bed prep cost/Acre
- Seeding cost/Acre
- Transplant cost/Acre
- Post harvest costs/Acre

POTATOES



POTATOES



All sales prices were at least $1/lb. The farm with the lowest gross sales had wide plant spacing and was affected by drought.

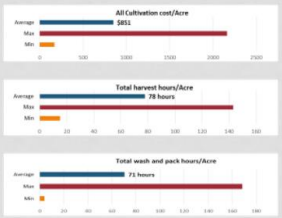
Gross profit is defined as total sales minus production expenses, not including overhead and marketing expenses.

Net profit is defined as total sales minus all expenses, including overhead and marketing expenses.

POTATOES

Case size is 50 lbs.

POTATOES



Hand weeding time is the largest cultivation expense.

The majority of farms used potato diggers.

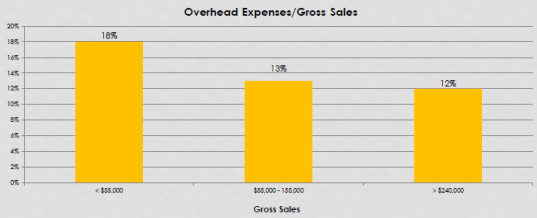
The wide variation is partly due to variation in per acre yields and partly from different wash and pack systems. The majority of farms washed and packed 3-4 cases/hour.

CROP COMPARISON

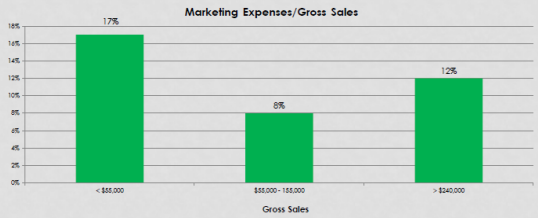
CROP COMPARISON

- What 3 main factors affect crop profitability?
  - Yield
  - Price of that yield
  - Cost of producing that crop
- What else determines if a crop is a good fit for a farm?
  - Demand/Market opportunities
  - Labor requirements
  - Cash flow considerations
  - Resource opportunities or limitations (equipment on hand)
  - Land rich or land limited

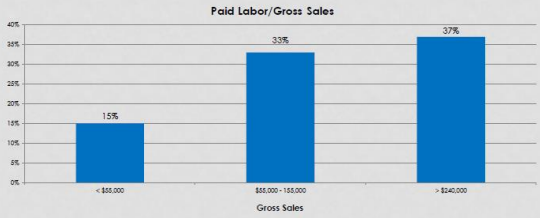
WHOLE FARM RATIOS



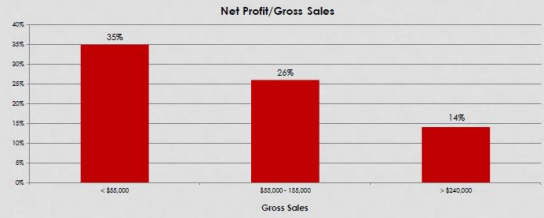
WHOLE FARM RATIOS

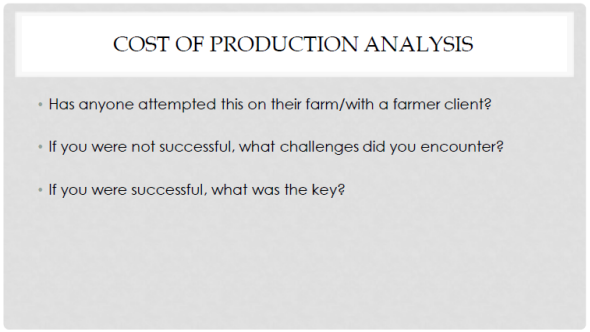


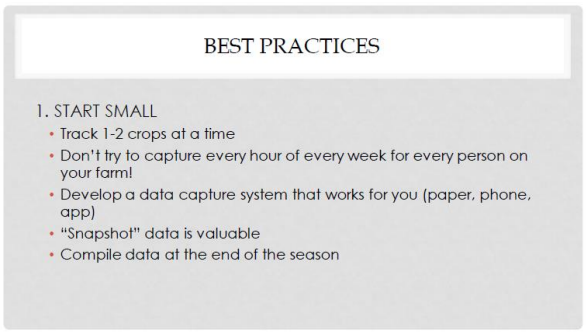
WHOLE FARM RATIOS

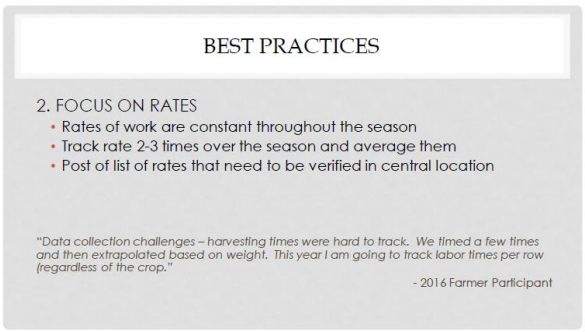


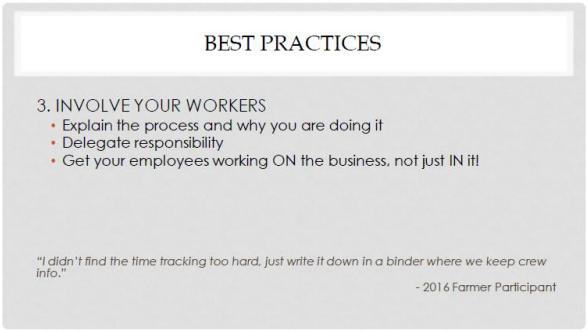
WHOLE FARM RATIOS











Fall NOFA Notes article

Organic Vegetable Cost of Production: It costs how much to produce those carrots!?

Though most organic vegetable farmers did not start farming for the money, the reality is that they cannot continue growing food if their farm is not profitable. The list of expenses that were part of producing each carrot sitting on your plate is extensive - seed, labor, tractors, packaging supplies, marketing, overhead, and more. In order to not only be profitable but to *maximize* their profitability, farmers need to determine which crops are worth growing and which crops are not pulling their weight. A profitable crop is one that covers all business expenses with some money left over to pay the farmer.

NOFA-VT, in partnership with NOFA-MA and NOFA-NH, is currently wrapping up a project designed to support farmers in calculating their crop-specific costs of production. Over the past

two years, we have worked with 30 organic vegetable farmers in our three states to select, track, and analyze data for one to three crops commonly grown in the Northeast. Looking at their numbers at the end of last season, one farmer participant noted: "Some crops that seem intuitively profitable are actually not that much better and sometimes worse than others that seem more onerous. And some aspects of a crop production that seem onerous actually don't cost that much at all."

Five factsheets are now available that present cost of production data aggregated from participating farms; these provide metrics to guide farmers' crop and production planning for winter squash, potatoes, onions, carrots, and head lettuce. Supplemental factsheets present tips for cost of production analysis, crop profitability comparisons, and whole farm financial metrics. The workbook used to gather this information is also available for use. Using this combination of tools, resources, and available technical assistance, farmers can strategically increase the profitability of their farm businesses.

Check out the factsheets and workbook at: www.nofavt.org/cost-of-production

---

September 29th press release for Cost of Production project
For Immediate Release

September 29, 2017

Contact:
Jen Miller
NOFA-VT Farmer Services Coordinator
jen@nofavt.org
802-434-4122 x14

NOFA Regional Project Offers Northeast Organic Vegetable Farmers a Better Understanding of their Profitability

Over the past two years, three NOFA chapters- Vermont, New Hampshire, and Massachusetts- worked with 30 organic vegetable farmers to determine the cost of production of vegetable crops commonly grown in the Northeast. The project, funded by a USDA Specialty Crop Block Grant, developed tools, provided technical assistance, and aggregated data into factsheets to support farmers' production planning and assist them in increasing the profitability of their farm businesses. Each farmer in the project selected one to three crops to track and analyze using a workbook created by Richard Wiswall, author of *The Organic Farmer's Business Handbook*. Looking at their numbers at the end of last season, one farmer participant noted, "Some crops that seem intuitively profitable are actually not that much better and sometimes worse than others that seem more onerous. And some aspects of a crop production that seem onerous actually don't cost that much at all."

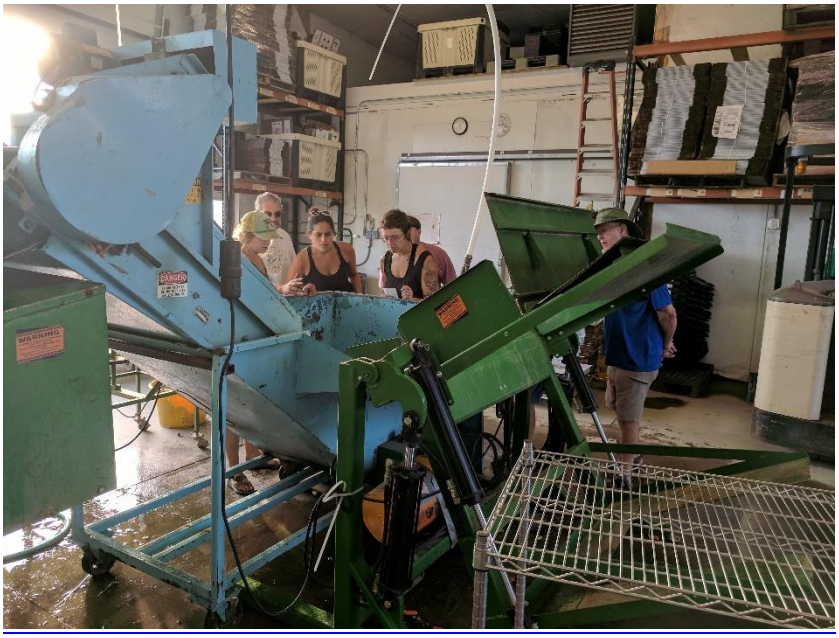
The results from participating farms were aggregated on a per acre basis into five crop-specific fact sheets that present key metrics such as net income, average price/case, cultivation hours/acre, wash and pack hours/acre, and many other data points related to the production of winter squash, potatoes, onions, head lettuce, and carrots. Supplemental factsheets present crop profitability comparisons, whole farm financial ratios, and tips for success when undertaking cost of production analysis.

This data provides a reminder of the reality that farmers cannot continue growing food if their farm is not profitable. The list of expenses that were part of producing each vegetable sitting on your plate is extensive - seed, labor, tractors, packaging supplies, marketing, overhead and more. In order to not only be profitable but to *maximize* their profitability, farmers need to determine which crops are worth growing and which crops are not pulling their weight. A profitable crop is one that covers all business expenses with some money left over to pay the farmer.

The cost of production workbook and the factsheets generated by this project can help farmers make informed decisions on crop mix, markets, and production systems that maximize their profitability. Interested farmers can access these resources and request technical assistance by visiting www.nofavt.org/cost-of-production or contacting Jen Miller, NOFA-VT Farmer Services Coordinator, jen@nofavt.org.

Photos from "Production Efficiency for Onions and Potatoes" at Hurricane Flats, July 2017

Photos from "Harvest Efficiency for Carrots and Beets" at Jericho Settlers, September 2017



Project 4: Food Safety Accreditation for Vermont Vegetable and Berry Farms – Final Report (Previously Accepted)

PROJECT SUMMARY

This project addressed the need for food safety planning and documentation by small- and medium-size fruit and vegetable farms that will not be required to comply with the Food Safety Modernization Act Produce Safety Rule. The long term goals of the project are to help these farms reduce risk and maintain credibility in the marketplace.

University of Vermont Extension collaborated with the Vermont Vegetable and Berry Growers Association (VVBGA), the state Agency of Agriculture, Food and Markets, and produce buyers to develop Community Accreditation for Produce Safety (CAPS). This farmer-driven program uses an on-line platform where farmers learn about best practices, write produce safety plans that address required food safety practices, and then document the implementation of their plans. This project was funded from 10/1/14 to 7/30/16.

PROJECT APPROACH

In October 2014, UVM Extension and the VVBGA began work on the CAPS program when it became clear that most growers in the state would either be exempt from or not covered by the Food Safety Modernization Act (FSMA) and that these farms did not have the capacity or market incentive to complete GAPS (Good Agricultural Practices) audits. Thus, CAPS was created to provide the majority of Vermont's growers with a practical and affordable program for demonstrating that they were addressing food safety concerns, thus maintaining their credibility in the marketplace.

From the outset, design and development of the CAPS program has been guided by an advisory board representing the VVBGA, the Vermont Agency of Agriculture Food and Markets, the Vermont Department of Health, and a statewide produce distributor. The CAPS advisory board identified 18

categories of required produce safety practices and worked with the CAPS program coordinator to develop specific descriptions of these practices and how they are documented.

Lessons learned from a 'mock accreditation' process in 2015 were used to make the on-line platform easier to use and more proscriptive. A custom on-line platform for CAPS was developed for 2016 by the University of Georgia Consortium for Internet Imaging and Database Systems (CIIDS). This tool makes it simple for farmers to write their plans in a consistent fashion, and to upload documentation during the growing season. It allows reviewers to easily access farm folder content and to submit their scores and comments on-line, which the program manager can then aggregate.

Specific rubrics for the 18 produce safety requirements were also developed to facilitate a uniform review process across farms for 2016. Although significant modifications were made to improve the CAPS platform after the 2015 pilot, growers that participated in the 'mock accreditation' offered positive qualitative feedback when asked about their experience, for example:

"I really appreciate the value of a CAPS coordinator to keep us reminded of our tasks and make sure we complete the program. Keeping the farmers on board is like herding cats. Individualized advice on how the requirements apply is also very helpful." - Elizabeth Wood, New Leaf CSA, Dummerston VT

"The UVM Extension Coordinator has provided us with invaluable support, encouragement, and expertise--turning CAPS participation from what could be ongoing headache into a real learning tool and valuable assessment program." - Bruce Wooster, Picadilly Farm, Winchester NH (on the border with VT)

"The individual attention provided to our farm, particularly a farm that is so small, has really motivated us to complete our CAPS pilot. Without encouragement and support, we would not be anywhere close to completing a food safety plan of any kind. In particular, the coordinator's understanding of our small-scale has really made it possible. The suggestions offered us have been realistic, within our budget, and have helped us become proud of our farm's food safety." - Becky Maden, Singing Cedars Farm, Orwell VT

"I've spent a lot of time muddling through this whole food safety thing over the last 5 years and this is the first time I've said "Oh, this is so clear, so easy!" Exactly what you need is spelled out very clearly in a very straightforward step by step process. It's all done online, and when it's finished it's available for buyers to view, with photos of your wash set up, cleaning protocols, the works! (Instead of expensive on-farm audits)." -Hank Bissell, Lewis Creek Farm, Starksboro, VT

"We take food safety seriously at our farm but without Extension expertise we would have a hard time communicating our efforts to customers and markets." - Eugenie Doyle, Last Resort Farm, Monkton VT

Goals and Outcomes Achieved

In spring of 2015, seventy farms used the CAPS on-line platform to complete preliminary produce safety plans, representing 1,729 acres of vegetable production and $9.44 million in annual sales, based on average sales per acre reported in the 2012 Census of Agriculture. Twenty-four of these farms were recruited to pilot-test the documentation methods, review process and on-line platform for accreditation; of these, 22 farms completed the process successfully. Two farms had personal issues that caused them to drop out of the pilot program.

Improvements were made to the CAPS program and it was opened up to all members of the VVBGA for 2016. Sixty-eighty farms enrolled in CAPS as of May, 2016, paying a $100 fee. These farms have completed their on-line produce safety plans and, over the course of the growing season, will document the implementation of their plans by uploading the required materials to their on-line farm folder. These

materials will be reviewed by teams of farmers and agency personnel at the end of the year. Farms completing all required documentation will become accredited by the VVBGA for the subsequent growing season. An additional 17 farms used the CAPS platform in 2016 to complete their produce safety plans but did not wish to become accredited, and did not have to pay a fee.

The 68 farms enrolled in CAP reported having 1,304 acres in crop production plus 715,442 square feet in greenhouse crop production. Based on 2012 Census of Agriculture data for field vegetables and greenhouse tomatoes in Vermont, these farms have annual sales of $12.44 million. Five of these farms are also participating in a pilot this year with the Hannaford supermarket chain that will use the CAPS program in place of GAPS by modifying a few documentation requirements and adding an on-farm audit. These audits will be conducted by the Vermont Agency of Agriculture, to provide corroboration of the documentation materials uploaded to the CAPS platform.

The number of farms engaged by this project to date falls short of the level expected when the project launched in 2014. A number of tasks proved more complex and in need of ongoing adaptation than anticipated, such as establishment of the produce safety requirements, procedures for document submission and review process, and design of the on-line platform. However, this work of this project has had significant impact on dozens of commercial vegetable and fruit farms, and it has laid the foundation for continued recruitment of farmers and refinement of the CAPS program over the next few years. This work will be funded by a mixture of USDA grants (Risk Management Education, Food Safety Outreach Program), philanthropy (High Meadows Fund, produce buyers), and grower fees.

LESSONS LEARNED

Several challenges with the CAPS program were encountered and dealt with during the initial phase of program development over the last 1.5 years. For example, the first on-line platform used for the program (called e360) was designed primarily for distance learning; it had many more features than necessary for farmers and reviewers but lacked several essential attributes for CAPS functionality. Thus, a new platform was designed specifically for the CAPS program.

Another problem encountered was initial skepticism about how a non-regulatory, non-governmental program could be credible in the marketplace and acceptable to state agencies. This was resolved through the active participation of buyers and regulators in development of the CAPS program, both on the advisory board, through informal feedback, and through direct and ongoing communication from the program manager.

A future pitfall could be difficulty in recruiting additional farmers to participate in CAPS. However, this seems unlikely given the growing awareness about the importance of food safety within the agricultural community, increasing pressure from buyers to demonstrate adoption of produce safety practices, and the strong support of the state's grower association and state agencies for CAPS.

Another pitfall could be legal challenges to accreditation decisions (i.e. farmers suing if they are denied accreditation.) To address this, the CAPS program requires enrollees to agree to a statement saying they will abide by the accreditation procedures and accept the reviewers' decision. Just in case, the VVBGA board has obtained directors and officers liability coverage.

From the outset, we have been clear that CAPS is not a regulatory program nor is it a guarantee of food safety. CAPS is not a substitute for complying with food safety laws, though it can be a part of that compliance. CAPS is simply a system by which VVBGA farmers have been engaged to establish their own food safety best practices and to recognize member farms that adopt them. A written disclaimer is associated with the program stating that CAPS is intended to help growers adopt improved food safety

practices and to share that information about these practices with their customers, but that CAPS has no legal or regulatory standing nor does it guarantee food safety.

CONTACT PERSONS

Vern Grubinger, 802-257-7967 vernon.grubinger@uvm.edu
Hans Estrin, 802-257-7967 han.estrin@uvm.edu

ADDITIONAL INFORMATION

This webpage describes the CAPS program and its components: https://practicalproducesafetyvt.wordpress.com. This webpage is the entry point for the CAPS platform where templates are available for writing produce safety plans and documenting their implementation: http://ciids.org/vvbga/farmer. Farmers will soon have the option of sharing their farm folder with other CAPS farmers, and eventually, with buyers. UVM Extension collaborated with the VVBGA, which hired CIDS at the University of Georgia, to develop this application. A password is required for login.

Project 5: Establishing a Vermont Herb Growers Cooperative – Final Report (Previously Accepted)

PROJECT SUMMARY

This project launched the Vermont Herb Growers Cooperative. Increasing numbers of specialty crop farmers in Vermont have shown interest in diversifying their operations by cultivating and marketing medicinal herbs. This impulse is strongly supported by burgeoning consumer demand for high-quality, organic herbs grown in the United States. The project expanded the number of farmers growing medicinal herbs at a commercial level from one to eight; this exceeds the projection of increasing by three-fold as stated in the original proposal.

The project team was uniquely suited to envision and launch the Cooperative based on expertise in medicinal herb growing and marketing, in provision of technical support to farmers, and in organizational development, research, and facilitation. The Cooperative is serving farmer members by providing a collaborative structure for joint marketing and business management, along with technical assistance in growing medicinal herbs, developing and implementing practices and measures for quality control/documentation, and creating/procuring specialized equipment for harvest and post-harvest processing.

Although in the early stages of marketing, the Cooperative will serve herbal product manufacturers and herb buyers by providing reliable quantities of high-quality, organic herbs from a single US-based source.

As the Cooperative grows, it will serve the specialty crop market in Vermont by supporting market stability and providing technical assistance for existing and new herb growers, increasing overall sales of herbs, and building and strengthening this new specialty crop sector.

PROJECT APPROACH

Stage 1: Getting Established
Task 1: Established Steering Committee, with representatives from four farms, project co-leaders, and project advisors. Convened first meeting on November 13, 2014, with eight attendees. The meeting had two primary agenda items: a session on cooperatives (conducted by Lynda Brushett of the Cooperative

Development Institute) and an overview of the various stages of the project, with an in-depth discussion of the market/feasibility study. Pamela Hathaway organized and facilitated the meeting, and Jeff and Melanie Carpenter also provided leadership. Members of the Steering Committee also participated.

Tasks 2, 5, and 6: Based on research and analysis of Cooperative models, complemented by the Coop 101 training received by Steering Committee members at the November 2014 meeting, the Steering Committee approved in concept the mission statement and governance principles presented at the meeting of March 24, 2015. The statement and principles were refined and presented at the November 2015 Committee/Board meeting.

Tasks 3 and 4: Pamela Hathaway was selected to prepare the market/feasibility study[1] (completed in March 2015); Rose Wilson, Richard Wiswall, Lynda Brushett, and Melanie and Jeff Carpenter were advisors. The study concluded that the Cooperative is an economically-viable venture, and provided specific guidelines to promote profitability. The Cooperative's Steering Committee of farmers and advisors voted unanimously to incorporate the Vermont Herb Growers Cooperative at their March 2015 meeting.

Task 7: An additional Board meeting was held November 5, 2015 (see Stage 2, Task 1). Pamela prepared background documents, briefed incoming and continuing Board members, and facilitated the meeting. The initial all-members meeting will focus on production and will be convened in January 2016 (see Stage 2, Task 7). *We revised the schedule and content of these meetings due to the need for additional preparatory work by the leadership team and the new Board in advance of the first all-members' meeting. Scheduling the all-members "growers meeting" for January 2016 also allowed more time for marketing prior to refining growers' 2016 bids. Pamela continued to communicate via email with prospective farmer members to keep them apprised of progress.*

Stage 2: Planning and Funding the Cooperative

Task 1: The Steering Committee/Board met on November 5, 2015. The agenda of that meeting included electing a formal Board, discussing the 2016 marketing agreement, approving the manager, approving an operating budget for the coming year, and establishing a fee structure for Cooperative members to help cover the cost of operations during that period. The leadership team was present at this meeting—Richard Wiswall continued as advisor to the Cooperative, Jeff Carpenter joined the Board as President, and Pamela Hathaway was voted in as General Manager of the Cooperative. Pamela did preparatory work for the meeting and facilitated the first part of the meeting, handing it over to Jeff once he was chosen as Board President.

Task 2: Pamela worked with Bob Brannan, who is providing pro bono legal assistance to the Cooperative, to file incorporation documents on September 14, 2015.

Task 3: Pamela worked with Rose Wilson on the Cooperative's Year One business plan, which was finalized and presented at the November Board meeting. Additionally, Pamela continued to actively seeking bridge/start-up funding from other sources.

Task 4: A 2016 marketing plan was implemented, led by Melanie and Pamela; this plan was the focus of the Cooperative's work through and beyond the first members' meeting in January 2016.

Task 5: A technical assistance plan was developed, and Jeff led implementation in conjunction with meetings of the Board and membership.

Task 6: Peggy Newfield of the Cooperative Steering Committee/Board worked with Pamela and Melanie to prepare quality assurance/production guidelines for the Cooperative. They were assisted by Stan

Ward, who received funding for this task from another grant (administered by the Vermont Housing and Conservation Board.

Task 7: Initial outreach to Vermont farmers was met enthusiastically; a short announcement in the Vegetable and Berry listserv (hosted by UVM's Agricultural Extension office) yielded over 40 responses, bringing the total number of interested farms to 65; a subsequent VPR story drove the number of interested farms into the 70s. A detailed fact sheet on the Cooperative was sent to all interested farmers. A second memorandum was sent to these growers in September; grower-members responded with growing estimates. Pamela is now working on a survey, with assistance from Melanie and Jeff Carpenter and Richard Wiswall, to further gather information that will help the Board ascertain who is ready to grow for the Cooperative in Year One. These growers (we are targeting between six and ten new growers for Year One) will be invited to the all-members production meeting in January 2016. The agenda of this meeting will include discussion of the fee structure and distribution of bids among growers.

Stage 3: Marketing and Managing the Coop
Task 1 and 2: An initial office was set up, with Pamela served acting manager.

Task 3: Melanie and Pamela initiated marketing for Year One (2016 growing season); marketing efforts will be focused during the period from November 1 to January 1.

Task 4: The Cooperative's website (www.vermontherbcoop.com) was launched in October 2015.

Stage 4: Operations and Evaluation and Monitoring
Task 1 & 2: Orientation meeting for new members and member meetings.

Task 3: Technical assistance to herb farmers/Cooperative members

Task 4: Assistance focused on seed sourcing, propagation, harvest techniques, drying, & quality control. Farm members tour of ZWHF June 2016 (Focus of tour was plant yields, crop specific drying techniques, & sampling.)

The following table summarizes Stage 4.

Stage 4: Operations and Evaluation and Monitoring		
Orientation meeting for new members	Pamela, Melanie, Jeff	March 2016
Member meeting #3	Coop Board (supported by Pamela)	April 2016
Review/implementation of business, outreach, and marketing plans	Coop Board (supported by Pamela, Melanie, Jeff)	Ongoing (Jan–Sep 2016 and beyond)
Technical assistance to herb farmers/Cooperative members	Jeff, Melanie	Growing season launch training (May 2016)
Evaluation and documentation of process	Pamela, Melanie, Jeff	Aug–Sep 2016

Task 5: Evaluation and documentation of process

- Data Analysis of Farm Reports & Herb Sample Quality Control3
- Lot Tracking Documentation of Supply Chain & Sales4
- Price Audit & Comparison

Task 6: Evaluation and documentation of "the process of developing a cooperative" completed and shared with entities in at least two other states.

Task 7: The project would facilitate documentation of lessons learned through the establishing the cooperative, including information about principles and practices of operation, potential markets, and appropriately scaled harvesting and processing equipment that could be valuable to groups in other states interested in forming medicinal herb growing cooperatives.

GOALS AND OUTCOMES ACHIEVED

Stage 1: Getting Established
The Vermont Herb Growers Cooperative (VHGC) is certainly an established group. 2016 product is being moved through various customers, markets for 2017 are lined up and we continue to add vendors to the list. In January we will hold a growers meeting where current and new growers will be able to bid on crops based on projected markets and sales. We have a PO box, a website, a bookkeeper for keeping the financial books and cutting checks, and appropriate insurance. VHGC itself is organically certified and all member farms have their own organic certification.

Stage 2: Planning and Funding the Cooperative
The VHGC comprises 8 growing members and one non-growing members. A Board of 5 was elected out of the membership. We have been making decisions for funding the cooperative as we move forward. This has proven to be a work in progress and we are constantly reassessing. As of now, we have 10% commission rate on all sales, a one-time equity fee of $1000 and an annual administrative fee of $100 to accompany Marketing Agreements (crop bids). Several members have loaned the coop in amounts from $500 to $2,000.00 for initial cash flow start up. We also received a loan and a small grant from the Castanea foundation, as well as a loan through the Center for Agricultural Economy in Hardwick, VT. The 2016 sales will carry our operating costs into the 2017 growing season.

Stage 3: Marketing and Managing the Coop
Task 1 and 2: Pamela Hathaway resigned as General Manager of the VHGC as of August 29, 2016. Management tasks are now being carried out by Board members and we are using Deep Roots Organic Coop in Johnson as a leveraged resource for payroll and book keeping.

Task 3: Melanie and Pamela initiated marketing for Year One (2016 growing season); marketing efforts were managed by Pamela up until the beginning of September at which time Mel and Jeff Carpenter of Zack Woods Farm have been managing the sales. So far sales have been successful and product is moving.

Task 4: The Cooperative's website is up and running. We continue to alter it as we move forward and changes take place.

Stage 4: Operations and Evaluation and Monitoring
Task 1 & 2: We held two orientation meetings for new members on January 3 and February 4. We held three member meetings on April 11, June 6, and August 7.

Task 3: Technical assistance to herb farmers/cooperative members have occurred in the following ways. Jeff provided email assistance & phone consultations regarding technical questions from February through October 2016.

Task 4: Zack Woods Herb Farm has offered technical assistance around seed sourcing, propagation, harvest techniques, drying, & quality control to all growing members. This technical assistance included

Farm members tour of ZWHF June 2016 with a focus on plant yields, crop specific drying techniques, and sampling.

Task 5: The VHGC is building a set of reference and process standards as a result of the Evaluation and Documentation of process. We have accumulated the following types of documentation: Herb Monographs; Standard Operating Procedures (SOP); Sample Farm Reports for Dandelion Root; Lot Tracking Documents; Product Code conventions; and Sample Certificates of Analysis . *A number of these documents are provided with this report as illustrations.*

Task 6: Regarding sharing with entities in other states, Jeff Carpenter is currently consulting and sharing coop pricing structure, marketing approaches (not specific markets) and farming techniques to Eugene Ripley, a grower enrolled in the Farm Viability program in Maine. Jeff also collaborated/presented and was keynote at The Medicinal Herb Growing and Marketing Conference in Washington state. This focused on marketing, Quality Control and medicinal herb farming techniques.

The Herb Coop has also shared information at the following places: International Herb Symposium 2017—creation of growers' track, and the upcoming 2017 NOFA winter conference intensive growers workshop, and AHPA-networking.

The coop is currently applying for a SARE Grant- Cost Of Production (COP) for Medicinal Herbs where we will track the finances associated with growing medicinal herbs. This information will then be shared with other organizations. SARE grants focus on research and the findings become common information for people to access.

Task 7: The cooperative held a class on Drying Principles & Equipment w/ Chris Callahan from UVM in April 2016. As a result growers have built new drying systems on their farms. In addition to their participation in the activities listed above, Jeff and Melanie Carpenter have provided technical assistance to herb farmers in Vermont and beyond. Here is a summary of that work to date in 2015.

From April 2015 to date, Jeff received 23 individual emails from people interested in medicinal herb farming and requests for help/consultations. He spends approximately 10-15 minutes responding to each of these emails providing advice and resources. On December 4, 2014, Jeff did a three-hour phone consultation for a start-up farm in Arizona (farmer name Joya Christina).

During the summer of 2015, Jeff did five three-hour tours on medicinal herb farming for the following farms, organizations, and schools: Misty Meadow Herb Farm, Vermont Center for Integrative Herbalism, Sterling College, and Seam Siren of Maui, HI. Jeff also conducted on-site farm consultations for Joanna and Tom Ring, including a visit of three hours to their farm on September 3, 2015, and a two-hour tour of ZWHF on September 6, 2015.

Jeff taught workshops on medicinal herb farming at the following events:

- International Herbal Symposium June 2015 (3 hours) Wheaton College: Approximately 75 people attended
- Mother Earth News Fair (1 hour) Sept 2015: Approximately 200 people attended
- Common Ground Fair (1 hour) Sept 2015: Approximately 60 people attended

Jeff and Melanie led a three-hour workshop at their farm for beginning and continuing farmers on May 22 2015, with 20 participants.

For farmers growing for the 2015 pilot collaborative growing program with ZWHF, Jeff has spent five hours working with samples, providing feedback, and answering questions regarding cultivation, drying and post-harvest processing.

Stage 4: Operations and Evaluation and Monitoring

- Orientation meeting for new members: We held two orientation meetings for new members on January 3 and February 4.
- We held three member meetings on April 11, June 6, and August 7.
- Technical assistance to herb farmers/Cooperative members
- Technical assistance to herb farmers/cooperative members have occurred in the following ways.
- Jeff provided email assistance & phone consultations re. Technical questions February thru October 2016. (Assistance focused on seed sourcing, propagation, harvest techniques, drying, & quality control.)
- Farm members tour of ZWHF June 2016 (Focus of tour was plant yields, crop specific drying techniques, & sampling.)
- Evaluation and documentation of process
- Data Analysis of Farm Reports & Herb Sample Quality Control
- Lot Tracking Documentation of Supply Chain & Sales
- Price Audit & Comparison

BENEFICIARIES

The Vermont Herb Growers Cooperative consists of eight founding member farms all of which are certified organic, along with one non-grower founding member. You can read and learn about our members on our website: (www.vermontherbcoop.com).

In the last year, the VHGC has built relationships with 15 mid to large-scale US based herbal product companies including 3 located here in Vermont. We have made sales to 6 of these companies and are currently working to secure growing contracts with three more for the 2017 season.

LESSONS LEARNED

We have found that it is important to clearly state the cooperative rules and protocols for operation and make sure we abide strictly by them. This ensures all communications remains professional and clear.

7 of the 8 members are new to growing medicinal herbs and so we have learned a lot about herb markets, pricing, lot tracking, coordinating orders among members, quality control, SOP's and basic herb cultivating and processing practices.

Herb Markets: We found the need to have purchase agreements with vendors to ensure the movement of product and help us plan for the year's growing bids. We had a few markets fall through for crops that growers had already started and we had to seek out additional markets to cover the movement of the product. This has caused a lot of thinking and discussion about risk management.

Pricing: We originally had been basing our pricing off small retail amounts. Given the market and amount of herbs we were trying to move we found we had to lower our prices to a competitive level with other sellers, such as Pacific Botanical and Mountain Rose. Having the new pricing information now allows us to better pick crops to grow for the following year and be assured of competitive pricing.

Lot Tracking: We have a standard lot tracking protocol. See VHGC lot tracking sheets and product codes. The tracking allows us to combine numerous lots from different farms.

Coordinating orders among members: As of now we are using the following protocol:

- When an order comes in, the member or members who bid on the crop equally supply the product. If a member grew the product "on spec" (as stated in their Marketing Agreement) then that member's product sells after the bidding members.
- For the following year those growers that fulfilled their bids on a given crop gets seniority to bid on that crop again.

Quality Control: We created standard operating procedures (SOPs) for quality control and sampling. More SOPs are in the planning stage. See Quality control and sampling flow chart in accompanying documents.

Herb Cultivating and Processing: The cooperative growers are continually learning about this as we go and sharing accumulating knowledge and technical expertise amongst themselves. Zack Woods Herb Farm continues to offer technical support and answer questions when needed. We also refer to the Organic Medicinal Herb Farmers Handbook written by Jeff and Mel Carpenter, as well as herbal monographs shared with the VHGC by customers and herbal organizations.

CONTACT PERSON

Jeff Carpenter, President of the Board, Vermont Herb Growers Cooperative,
zachwoodsherbfarm@gmail.com, 802-888-7278

ADDITIONAL INFORMATION

The following supporting documents are copied below:

1. Standard Operating Procedures for the preparation of an herb sample
2. Standard Operating procedure for herb deliveries
3. Grower Herb Sampling Log Sheet
4. Combined Sample Receiving Log for aggregated product
5. Herb Specification
6. Lot Tracking Codes
7. Quality Control and Sampling Flow Chart

Vermont Herb Growers Cooperative
Standard Operating Procedure

SOP ID: G-SOP-VHGC-001 v1.0
SOP Title: Preparation of an Herb Sample for Testing

TABLE OF CONTENTS

PURPOSE

The purpose of this Standard Operation Procedure (SOP) is to describe the process to be used by the Vermont Herb Growers Cooperative (VHGC) to sample individual and combined lots of herbs for the purpose of testing prior to shipping herbs to VHGC customers.

Notes:

The protocol utilized in this procedure is adapted from the European Pharmacopoeia sampling plan.

Toxic botanicals, or botanicals subject to adulteration with a toxic herb may require more stringent sampling criteria than non-toxic botanicals (presence of any amount of the adulterant is cause for rejection).

SCOPE

This SOP is applicable to all members of the VHGC and any other personnel either volunteer or employed for individual farms who are responsible for the testing process.

This process described in this SOP is applicable to all samples taken for the purposes of herbal quality validation, although the samples themselves may be subject to different types of tests during the Quality Assurance/Quality Control (QA/QC) process. (Refer to SOP-VHGC-002 Quality Assurance/Quality Control).

ROLES AND RESPONSIBILITIES

Grower
Responsible for:
- For single-farm sale, preparing herb sample and sending to the third-party lab.
- For multiple-farm combined sale, preparing herb sample and sending to the QA/QC Inspector at the VHGC Collation Center.

QA/QC Inspector
Responsible for:
- Preparing samples for testing, sending to third-party lab.

PROCEDURE

RESPONSIBILITY	**PROCEDURAL STEPS**
Sampling of dried herb from a single source (one farm)	
Grower	1. Samples after garbling (or other handling), bagging, and boxing. 2. If the order is one to five boxes (between 1 and 100 lbs. dried weight), take a portion of the sample from each box. 3. If the order is six to 50 boxes, take a portion of the sample from five of the boxes. 4. If the order is more than 50 boxes, sample from 10% of the boxes. 5. From each box being sampled, take samples from the top (not less than 10 cm from top), middle and bottom of the box and mix together. Start with about 3 ounces total from each box. 6. Forms the mixed sample into square-shaped heap; divide diagonally into 4 equal parts; take two diagonally opposite parts and mix carefully. Repeat until the required quantity is obtained (total sample

RESPONSIBILITY	**PROCEDURAL STEPS**
	size should be five ounces: two ounces for third-party lab testing, and three ounces retained by the Grower for additional testing and identification if needed). 7. After representative 5 oz. sample is derived, packages 2 ounces in a food-grade plastic bag, seals or closes with twist tie, and mails in manila envelope (padded is preferred) to the QA/QC inspector or directly to the third-party lab, depending on whether or not the product is single-farm sale, or a combined-farm sale. 8. Remaining sample material will be stored by the Grower until the product has passed inspection and is accepted by the customer. 9. Logs sample information using Template 01 VHGC Grower Herb Sampling Log and enters follow-up notes.
Dried herb from multiple sources (two or more farms)	
Grower	1. Samples after garbling (or other handling), bagging, and boxing, in accordance with the steps in section 4.1. 2. Sends each sample to the VHGC collation facility. 3. Logs sample information using Template 01 VHGC Farm Herb Sampling Log and enters tracking and follow-up notes for testing results and next steps.
QA/QC Inspector	4. Receives and samples from two or more farms and mixes them in proportion with the amount that will be used from each farm to fill a given order. For example: If three farms are providing 20, 40 and 40 lbs respectively for a 100 lb. order, the inspector would take one-fifth from the first sample and two-fifths from each of two remaining samples. 5. Logs sample information using Template 02 VHGC QA/QC Combined Sample Receiving Log and enters tracking and follow-up notes for testing results and next steps for all sample received from Growers and sent to third-party labs. 6. Forms the mixed sample into square-shaped heap; divide diagonally into 4 equal parts; take two diagonally opposite parts and mix carefully. Repeat until the required quantity is obtained (total sample size should be five ounces: two ounces for third-party lab testing, and three ounces retained at the VHGC collation center for additional testing and identification if needed). 7. After representative 5 oz. sample is derived, packages 2 oz. in a food-grade plastic bag, seal or close with twist tie, and mail in manila envelope (padded is preferred) to the third-party lab. 8. Stores the remaining sample material (both uncombined and combined) at the VHGC collation center until the product has passed inspection. 9. If the product fails initial testing, sends separate samples from each of the farms from which the combined lot sample was derived to the testing facility (if sufficient material was retained at the VHGC collation facility, the QA/QC Inspector will use this material; if not, s/he will request from the farm's stored sample). 10. If one or more of these samples fails the test, rejects the product and, if necessary, finds another farm to supply the amount of product needed to fill the order. 11. Combines material from a two-ounce sample from the new farm with the remaining material from the other farm(s) that will be fulfilling

RESPONSIBILITY	PROCEDURAL STEPS
	the order in proportion with the amount to be supplied from each farm. 12. Sends the new sample to the testing lab. 13. If the sample fails the test a second time, the entire product will be rejected.

ABBREVIATIONS

Abbreviation	Description
QA/QC	Quality Assurance/Quality Control
SOP	Standard Operating Procedure
VHGC	Vermont Herb Growers Cooperative

INTERNAL REFERENCES

1. SOP-VHGC-002 Quality Assurance/Quality Control

EXTERNAL REFERENCES

1. European Pharmacopeia Sampling Protocol

ATTACHMENTS AND TEMPLATES

TEMPLATE 01 to G-SOP-VHGC-001 v1.0
VHGC Grower Herb Sampling Log

TEMPLATE 02 to SOP-VHGC-001 v1.0
VHGC QA/QC Combined Sample Receiving Log

SOP for Herb Deliveries:

- All deliveries need to include labeled bags in boxes with an invoice (or the invoice can be emailed).
- All samples, crops, & invoices need to have lot numbers. Please see the recommendations and codes attached for standard lot numbers.
- Deliveries need to be done on Tues or Thurs (unless other arrangements are made). This is when Bethany is here and we can check the herbs in. She had been doing this as part of her normal ZWHF work day so streamlining the time this takes is important.
- If mailing herbs, please make sure that they arrive on the agreed upon day. If herbs are rejected, the farmer will need to either come get herbs or pay for return shipping
- Use standard packaging material.
- Quality of herbs delivered need to match the sample. Lot numbers of delivered herbs MUST match the lot number on sample if prior testing was required.
- Please double check weights and make sure to account for packaging.

Sampling Log

Vermont Herb Growers Cooperative

Page _____ of _____

Product & Date Sampled	Qty	Grower/Farm Name	Grower's Sample #	Date Sent	Send to VHGC	Sent to 3rd-party lab	Lab Name/Address/ Phone	Quality Control: Accepted (Yes/No)	Quality Control: Action taken (record details in Action Log)
					❑	❑			
					❑	❑			
					❑	❑			
					❑	❑			
					❑	❑			
					❑	❑			
					❑	❑			

Combined Samples Log | Vermont Herb Growers Cooperative

Product Name	
Product Code (optional)	
Today's Date	
Sample number for combined sample (create new for this product)	
Expiration date of sample produced	
Production Team (all names)	
Production Location	

List of lots combined

Grower/Farm Name & Sample #:	**Qty used**

Qty of product produced	
Surplus Sample Amount & Storage Location	
Date Sent to Lab	
Name/Address of Lab	
Phone Number of Lab	
Follow-up Dates / Notes	
Test Results - Next Steps	
Employee Name	
Employee Signature	
Reviewed by	

Sample Herb Specification

Angelica

Radix Angelicae
Angelica archangelica

PLANT MATERIAL OF INTEREST: DRIED ROOTS

General Appearance: Root stocks 1.5-4 cm in diameter, annulated, apex obtuse, showing purple or yellowish-green remains of stems and leaf sheaths; main roots lumpy on the surface, branching roots 0.3-1.0 cm in diameter, upper portion thick and lower portion thin, mostly twisted, with a few rootlet scars. Texture flexible, fracture yellowish-white or yellowish-brown, thick epidermis, showing some clefts and numerous brown spotted secretory cavities; wood paler in colour than the bark, cambium ring yellowish-brown.

Organoleptic Properties: Odour: strongly aromatic; taste: pungent, bitter. [most reliable way to distinguish it from A. sinensis]

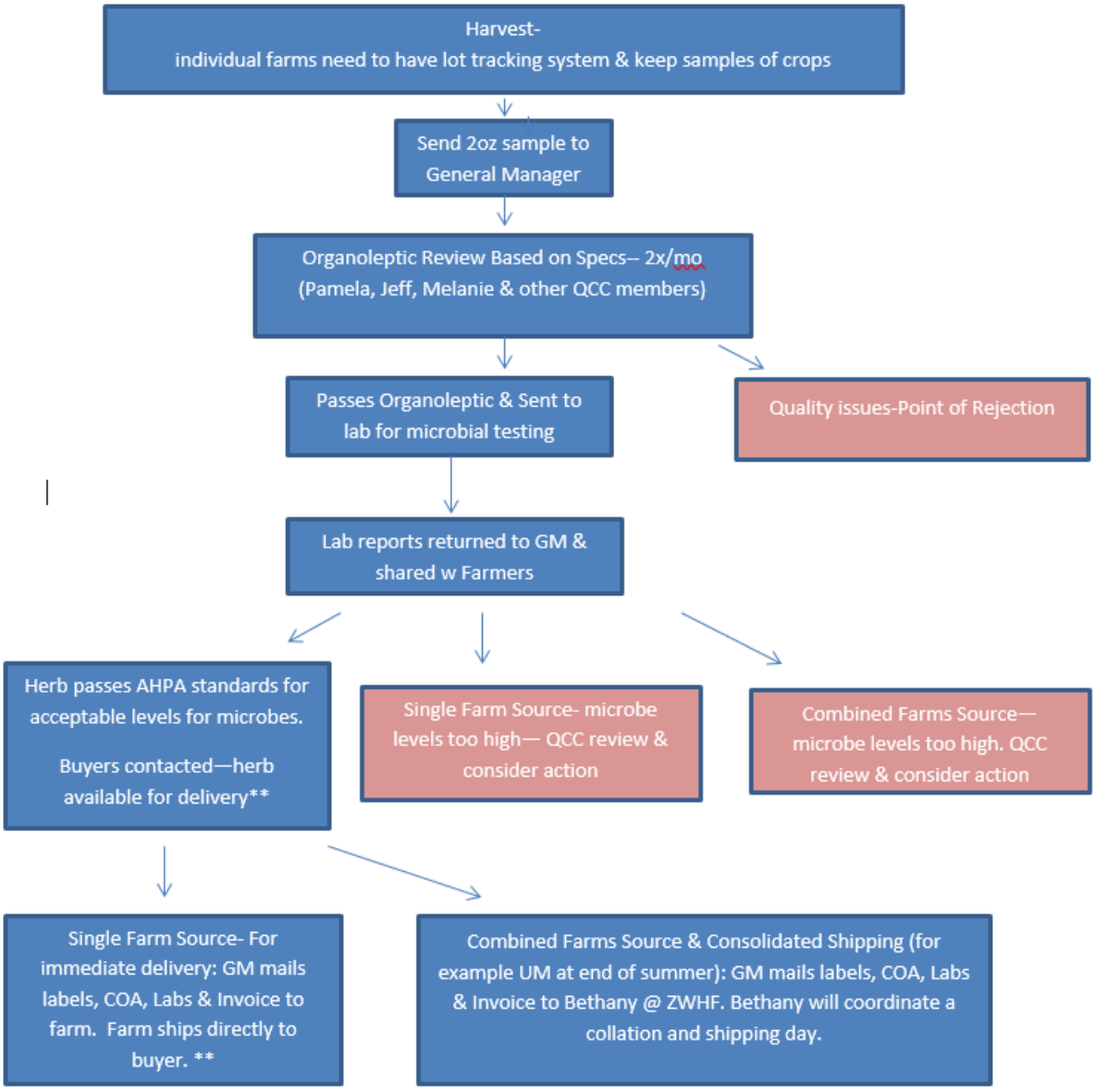
Rejection Criteria: Pale or colorless in appearance. Lack of characteristic odor. No pungency on tasting. Excessive presence of stem and pith (wrong part harvested). *A. sinensis*, an allied species and common substitute, has a sweeter flavor that lacks almost any pungency and should be rejected.

Special Notes: the lots we've received in the past have been average cut and sifted pieces with some powdery amount settling to the bottom.

Vermont Herb Growers Cooperative Product Codes

Common name	Botanical name	Plant part	Code
Angelica	*Angelica archangelica*	Root	AAR
Anise Hyssop	*Agastache foeniculum*	Leaf	AFL
Burdock	*Arctium lappa*	Root	ALR
Marshmallow	*Althaea officinalis*	Leaf	AOL
Marshmallow	*Althaea officinalis*	Root	AOR
Black Cohosh	*Actaea racemosa*	Root	ARR
Oats	*Avena sativa*	Herb	ASH
Cayenne	*Capsicum frutescens*	Fruit	CFF
Calendula	*Calendula officinalis*	Blossom	COB
Cilantro	*Coriandrum sativum*	Herb	CSH
California Poppy	*Eschscholzia californica*	Herb	ECH
Echinacea	*Echinacea purpurea*	Herb	EPH
Echinacea	*Echinacea purpurea*	Root	EPR
Meadowsweet	*Filipendula ulmaria*	Herb	FUH
Elecampane	*Inula helenium*	Root	IHR
Motherwort	*Leonurus cardiaca*	Herb	LCH
Lemon Balm	*Melissa officinalis*	Herb	MOH
Peppermint	*Mentha piperita*	Leaf	MPL
Chamomile	*Matricaria recutita*	Blossom	MRB
Spearmint	*Mentha spicata*	Herb	MSH
Wild Mint (purple)	*Mentha spp.*	Leaf	MSL
Catnip	*Nepeta cataria*	Herb	NCH
Tulsi	*Ocimum sanctum*	Herb	OSH
Red Clover	*Trifolium pratense*	Blossom	RCB
Red Clover	*Trifolium pratense*	Herb	RCH
Yellow Dock	*Rumex crispus*	Root	RCR
Skullcap	*Scutellaria laterifolia*	Herb	SLH
Spilanthes	*Spilanthes spp.*	Herb	SSH
Sage	*Salvia spp.*	Leaf	SSL
Dandelion	*Taraxacum officinale*	Leaf	TOL
Dandelion	*Taraxacum officinale*	Root	TOR
Thyme, German winter	*Thymus vulgaris*	Leaf	TVL
Nettle (stinging)	*Urtica dioica*	Leaf	UDL
Blue Vervain	*Verbena hastata*	Herb	VHH
Valerian	*Valeriana officinalis*	Root	VOR
Ashwagandha	*Withania somnifera*	Root	WSR

Quality Control & Sampling Flow Chart 2016



* Coop will supply farmers with specs and pictures of herbs when available.

**Buyers that require additional testing will be sent a sample and the coop's microbial lab reports. Cost for additional testing (heavy metal, constituent levels etc.) is the responsibility of the buyer.

Project 6: Standard Practices for a New System of Maple Syrup Production – Final Report (Previously Accepted)

PROJECT SUMMARY

Maple producers face major barriers to increasing the productivity of their operations and growing their businesses, as expansion typically requires the purchase or lease of large tracts of mature, forested land at prohibitively high expense. We have recently developed a technique through which sap can be harvested sustainably from small maple trees in regenerating forest stands. As these types of stands are present in many maple operations, this technique would enable many maple producers to overcome this barrier to expansion and increase the productivity and annual income of their operations. In addition, it would turn what is currently a long-term ongoing expense (periodic thinning to develop a mature sugarbush) into an income-generating activity. However, standard practices for implementing this type of system do not currently exist. Thus, the overall objective of our proposed project is to develop a set of standard practices for implementing a sap collection system in existing regenerating maple stands that maple producers will use to initiate the practice and increase the productivity and income of their maple operations. Producers will ultimately be able to use this document to implement the practice and increase the productivity and income of their operations.

PROJECT APPROACH

To accomplish the overall project goal as outlined in the Work Plan, we first conducted a review of the existing literature and resources related to this subject area (including the management of sugarbush stands, the physiology of regenerating maple trees, etc.), and compiled relevant information. We also compiled the relevant existing data and information from the past research we have conducted on the collection of sap from small-diameter maple trees. In addition, we set up 2 pilot plots in regenerating maple stands and conducted experiments to measure sap yields from saplings in regenerating stands and assess the extent of subsequent regeneration in lower-light, understory conditions to establish baseline sap yields and assess the overall feasibility of implementing this technique over multiple years in regenerating stands. The results from these experiments demonstrated that yields ranged from 0.02 – 0.06 gallons of syrup equivalent per tree, and that regeneration was typically vigorous, and likely sufficient to support multiple years of sap collection from saplings in regenerating stands. We compiled all of these data and information and used them to write a document which outlines the basic concepts of sap collection with this system and its application in regenerating maple stands.

One unforeseen challenge that developed was that the cap fittings required to implement this type of sap collection have not begun being manufactured commercially as of the time of this report's submission. Until the caps are commercially available, producers will not be able to begin implementing sap collection in regenerating stands. We anticipate the caps will be commercially available within the next 2 years.

GOALS AND OUTCOMES ACHIEVED

Completion of the practices document represented the achievement of the project's overall goal, and thus all project goals have been completed. This document was posted on the University of Vermont Proctor Maple Research Center (UVM-PMRC) website (www.uvm.edu/~pmrc) in September 2016. Producers are able to download the document and use the information to learn about the practice and begin implementing it in regenerating stands in their operations. For these producers, this will ultimately lead

to the accomplishment of longer-term outcomes of increasing the income and profitability of their operations.

BENEFICIARIES

Maple producers in Vermont and throughout the maple producing region of the United States will be able to benefit from this project's accomplishments. We will assess the number of producers reached with the project information by using internet analytic software to count the number of producers who download the practices document. Over the longer-term, follow-up surveys will ultimately be conducted to assess whether producers have implemented the practices, and experienced an increase in net income as a result.

LESSONS LEARNED

No unusual unexpected outcomes or results were experienced.

CONTACT PERSON

Abby van den Berg, Ph.D., University of Vermont Proctor Maple Research Center, (802) 899-9926, Abby.vandenBerg@uvm.edu

ADDITIONAL INFORMATION

The final technical report has been published on our website at http://www.uvm.edu/~pmrc/Perkins%20and%20van%20den%20Berg%202016_Sap%20Collection%20from%20Small-Diameter%20Trees.pdf.

Project 7: Reducing Pest Damage and Enhancing the Viability of Specialty Crops with HGM Cover Crops – Final Report

PROJECT SUMMARY

Many broadleaf specialty crops in the Northeast experience pest and disease damage that leads to crop losses, expensive prevention measures, or decreased quality product. Vegetable and crop producers continuously need to work to prevent and treat insect, weed, and disease pests. Alternatives that reduce pest pressure and contribute to crop and soil health are desirable. Planting high glucosinolate mustard (HGM) cover crops may have the potential to reduce pest pressure and improve soil health in the subsequent crop. Once HGM cover crops are incorporated, glucosinolate compounds found throughout the plant break down into a number of secondary compounds, which can be biocidal to pests. In addition the HGM keeps the ground covered with a living cover crop for months after a regular-season crop helping to scavenge excess nutrients and build soil organic matter.

This project focused on integrating HGM cover crops prior to the production of potato and bean crops. Potato and bean growers throughout Vermont struggle with disease issues. The demand for potatoes is dependent on appearance and consumers often refuse potatoes with skin defects such as common scab or rhizoctonia, and potatoes for seed are rejected if they have skin damage. Rhizoctonia, the fungal disease, is common in cool, wet growing regions like the Northeast. Reducing these skin diseases would increase the marketable yields of potato crops. Snap beans are in high demand in the Northeast, as markets and cooperatives continuously encourage growers to increase the regional supply. If weed and disease pressures, including white mold, were reduced and yield improved then beans may be a more viable

crop for Vermont growers. These two crops, beans and potatoes, were chosen specifically for this project because they are prone to significant disease issues that severely limit yield and quality. Through this project the impact of HGM cover crops on potato and bean yields and quality were evaluated. Best agronomic practices for producing HGM cover crops were also evaluated through variety and planting date studies. Outreach materials were delivered to 1296 number of farmers and stakeholders at field days, conferences, webinar, and online materials. Over 500 farmers learned how to implement HGM cover crops and 46 farmers adopted HGM cover crops and reported improvements in soil health, pest management, and yields of specialty crops.

PROJECT APPROACH

August 2015 – The HGM trial was planted on August 17, 24, and 31 at Borderview Research Farm in Alburgh, VT and on July 31 and August 17, 2015 at High Mowing Seeds in Wolcott, VT. While we initially had planned in the grant to work with the Intervale Community Farm in Burlington, VT, at time of planting the project fit better into High Mowing Seeds production. We relied on management at Borderview Research Farm and High Mowing Seeds as project partners for this initiative.

Four varieties of mustard were planted: Caliente '199', '119', and '61' and Terminator at both locations. An initial soil sample was taken and the area was amended with required nutrients based on soil test results. The HGM plant populations, heights, and plant vigor was recorded at each location.

October 2015 – The HGM trials, at time of flowering, was subsampled to determine dry matter yields and nutrient concentrations. By the end of October, the mustard was mowed and then incorporated at each location.

May 2016 – All experimental plots were soil sampled to determine nitrates, phosphorus, potassium, magnesium, calcium, pH, and various micronutrients. At High Mowing Seeds, an additional treatment of HGM seed meal was applied at 522 lbs/acre in May. This was to compare if the addition of whole plant HGM biomass differed from applying just HGM oilseed meal. On 5-May potatoes were planted into treatment plots at Borderview Farm. On 25-May snap beans were planted at High Mowing Seeds in Wolcott, VT. While we originally planned in the grant to grow dry beans, snap beans were used instead since they require a shorter growing season, would fit into the cooler, hilly growing region in Wolcott, and are comparable to dry beans.

June to August 2016 – Potatoes were irrigated and pests were managed. The potatoes were planted into plastic to prevent weed pressure. The snap beans were hand weeded 3 times prior to harvest. The emergence date and populations for potatoes and snap beans were recorded. One and a half months after planting, percent of cover by weeds and population type (broadleaf vs grass) was recorded. Leaf disease in the snap beans was assessed on July 25. Snap beans were harvested on August 2 and yield was recorded. A subsample of roots from each plot was collected for disease assessment. Potatoes were harvested on August 1 and yields were recorded. At harvest, a subsample of potatoes from each plot was assessed for rhizoctonia and scab diseases.

On August 15, five varieties of HGM were planted: Trifecta, Caliente 119, Caliente 199, Kodiak, and White Gold. On August 15, HGM was also planted at five seeding rates: 5, 10, 15, 20, and 25 lbs/acre. Two varieties of HGM, Caliente 199 and 119, were planted on August 15, 23, and 29, to evaluate yield differences based on planting date. Plant populations, vigor, and heights were measured for all HGM planted.

October 2016 – In October, at time of flowering, a subsample of the mustard was harvested and data was collected on percent moisture, yields, and white mold presence, and the mustard was analyzed for nutrient quality.

May 2017 - Potatoes were planted where the aforementioned five varieties of HGM had grown and have been managed to prevent severe pest pressure.

June to August 2017 – Data was collected on the emergence date, populations, percent cover by weeds, and weed populations. The potatoes were harvested at the end of August and evaluated for yield and skin disease.

GOALS AND OUTCOMES ACHIEVED

Goal 1: A tangible goal of grantee's project will be the development of agronomic practices to improve the efficacy of HGM crops in reducing pests and improving soil health in specialty crops.

Agronomic practices to improve the use and efficacy of HGM cover crops were developed as a result of this project. Results from 2015-2016 showed certain HGM varieties (Caliente 61 and Caliente 119) yielded significantly higher than the others. Consequently, those potatoes grown in those varieties' plots had significantly lower incidence of skin disease. Earlier planting dates at both locations yielded significantly more HGM biomass than later planting dates, suggesting it is best to aim for the end of August to plant. Lastly, spring-applied mustard meal plots had significantly lower incidences of root rot disease in the subsequent snap bean plants.

These agronomic recommendations as well as trial results were shared with growers and stakeholders through a variety of outreach avenues including field days, conferences, webinar, research reports, and a guide.

April 18, 2016: Video on the HGM cover crop project was completed and posted YouTube (https://www.youtube.com/watch?v=qJU6ZFjW7wY). The video has received 115 views since posting.

July 24, 2016: A presentation was given at the Annual Northwest Crops and Soils Field Day at Borderview Farm in Alburgh, VT. Participants were able to view the research plots and learn about the value of HGM cover crops. There were 225 participants. Based on the evaluation results 102 attendees learned how to implement HGM cover crops and 15 planned to try the practice.

August 21, 2016: A presentation was given on HGM cover crops sharing preliminary results at High Mowing Seeds to an audience of 25 attendees. Based off of our evaluation, 100% of attendees learned about potential uses and benefits of HGM and 47% of them planned to grow it in the future.

October 28, 2016: The HGM research project was showcased during the cover crop field day at Borderview Farm with 29 attendees. Attendees were surveyed and 100% noted that they learned about the benefits of HGM cover crops and 40% of them planned to try HGM cover crops on their operations.

January 5, 2017: Based on all data from the HGM grown in 2015 and the vegetables grown in 2016, a farmer-friendly research report titled "High Glucosinolate Mustard as a Biofumigant" was developed and published at http://www.uvm.edu/extension/cropsoil/wp-content/uploads/2016-HGM-Trial.pdf. There have been 202 downloads of the research reports since posting.

March 22, 2017: Second video on HGM cover crop project and trial results is developed and posted on YouTube (https://www.youtube.com/watch?v=TJC645-fDaE). This video has had 77 views since posting.

April 12, 2017: A webinar on eXtension titled, 'Use of High Glucosinolate Mustard as an Organic Biofumigcant in Vegetable Crops,' was presented in collaboration with Katie Campbell-Nelson from the University of Massachusetts. There were 203 attendees that participated in the webinar. Two hundred and three people attended the webinar. 98% of survey respondents gained a better understanding of potential uses and benefits for HGM, 52% responded that they plan to grow HGM as a result of what they learned, and 10% indicated that the information in the webinar helped them fine-tune their HGM cover crop strategies.

July 15, 2017: Manual titled "Using HGM as a Cover Crop to Reduce Weeds and Disease" (http://www.uvm.edu/extension/cropsoil/wp-content/uploads/HGM-manual-final.pdf) describing how to integrate HGM into a specialty crop system and research results was developed and posted online. Since posting there have been 75 online downloads. In addition the manual was distributed at field days and conferences.

July 27, 2017: The HGM research trial was highlighted at the Northwest Crops and Soils Annual Field Day. Results were delivered to 310 attendees. Of the 125 attendees that returned surveys, 100% indicated they better understood the value of HGM cover crops and how to implement in their systems. Fourteen of the respondents indicated that they had already adopted HGM cover crops in various vegetable production systems.

August, 2017: Two on-farm workshops hosted at vegetable farms in Vermont (Benson and Thetford, VT) focused on cover crops and nutrient management was hosted in conjunction with NOFA-VT. The field day allowed the distribution of research results to 60 attendees. The hosts of the field day had adopted HGM cover crops into their farming systems. Of the attendees 95% indicated improved knowledge on how to implement HGM cover crops and 10 farmers were implementing or had tried HGM cover crops.

Project Outcome 1: Through this project at least 500 specialty crop producers will increase their knowledge of how to implement successful HGM cover crops to suppress pests and improve crop yield and quality. Increase in knowledge will be documented through surveys distributed post workshop events.

Nationally, regionally and locally approximately 1296 stakeholders received information on integrating HGM cover crops into their specialty crop system. Stakeholders received information through a variety of mechanisms including online resources, webinar, video, field day, and conferences. Stakeholders reached per outreach and education efforts are broken out by individual effort above. Of the 1296 stakeholders reached through this project over 500 indicated an increased knowledge in how to successfully implement HGM cover crops on their farms. Specific information on this outcome is below and was gained through survey of participants at 6 outreach events.

Outcomes from Outreach Events

At the 2016 Northwest Crops and Soils Annual Field Day 102 attendees learned how to implement HGM cover crops and 15 planned to try the practice.

At the High Mowing Seeds Field Day 25 attendees learned about potential uses and benefits of HGM and 11 of them planned to grow it in the future.

Twenty-nine attendees at the Northwest Crop and Soil Cover Crop field day noted that they learned about the benefits of HGM cover crops and 12 of them planned to try HGM cover crops on their operations.

Of the 203 people attending the webinar 198 increased their knowledge on how to implement HGM cover crops. Twenty of the attendees were growing HGM and the information helped to fine-tune their HGM cover crop strategies.

Following the 2017 Annual Northwest Crop and Soil Field Day 125 attendees indicated they better understood the value of HGM cover crops and how to implement in their systems. Fourteen of the respondents indicated that they had already adopted HGM cover crops in various vegetable production systems.

At the 2017 cover crop workshops, 58 attendees indicated improved knowledge on how to implement HGM cover crops and 12 farmers were implementing or had tried HGM cover crops.

Project Outcome 2: Through this project at least 25 specialty crop producers will begin growing HGM cover crops with the intent of suppressing pests and improving yields.

Surveys administered following outreach events provided insight on adoption of the HGM cover crop practice on farms in the region. Surveys administered at 6 events indicated that 46 farmers were currently implementing or had tried HGM cover crops in their specialty crop systems. Of these 46 HGM adopters 26 were surveyed as to the benefit of HGM on crop yields, pest management, and soil health. These farmers indicated that HGM cover crops improved soil condition (95%), reduced pests (78%), and improved yields (26%) on their farms. Farmers had a difficult time quantifying the extent of improvements but 80% felt that the practice would become a consistent and necessary aspect of their rotation and production system Farmers were especially confident that soil health had improved and likely was leading to higher or at least potentially more stable crop yields. Likely the quantification of yield, soil, and pest improvements would take longer to realize than the project period.

BENEFICIARIES

Specialty crop beneficiaries for this project include vegetable and dry bean producers and their associated industry. Nationally, regionally and locally approximately 1296 stakeholders received information on integrating HGM cover crops into their specialty crop system. Stakeholders received information through a variety of mechanisms including online resources, webinar, video, field day, and conferences. Our research has shown that rhizoctonia activity can be reduced by as much as 58% and scab can be reduced by as much as 24% in potatoes by growing HGM cover crop, translating to a substantial economic impact through reduced losses. As a result many farmers were encouraged to try or adopt the HGM practice as part of their pest management system. From project surveys conducted following events, it is estimated that 46 farmers have adopted or tried HGM in their farming systems. These farmers indicated improved soil condition (95%), reduced pests (78%), and improved yields (26%). Farmers had a difficult time quantifying the extent of improvements but 80% felt that the practice would become a consistent and necessary aspect of their rotation and production system. Likely the quantification of yield, soil, and pest improvements would take longer to realize than the project period.

LESSONS LEARNED

We had originally anticipated much more HGM cover crop biomass, however, over the past two years it has not gotten taller than 3-4 feet. Other regions (Pacific Northwest) obtain 2 to 3 times the level of biomass from HGM. It is possible that due to the regional climate the crop is unable to produce more biomass. Future research needs to be conducted to evaluate earlier planting dates with higher seeding rates. Main season crop production at partner farms kept us from establishing the cover crop earlier.

There are a number of termination methods that could have been investigated and may have improved the efficacy of the biofumigant against pests. The project was limited in its ability to do so but future research should investigate such termination methods as irrigating the crop after disking in order to create a liquid seal and trap in the biofumigant, or rolling and packing after disking.

Evaluation of project impacts/outcomes was conducted following outreach events, however it was difficult to collect specific information from farmers as to the extent that HGM has impacted yields, soils, and pests. Most every farmer that has adopted or tried HGM cover crops indicated that soil, yield, and pests management were improved but unable to really quantify the impact. Obviously it may take numerous years to be able to quantify the impact of such practices on farms. However it was clear that farmers were implementing the practice, felt it had benefits, and would continue to do so into the future.

CONTACT PERSON

Heather Darby, 278 S. Main Street, St. Albans, VT 05478
Phone: 802.524.6501 Email: heather.darby@uvm.edu

ADDITIONAL INFORMATION

- VIDEO: High Glucosinolate Mustard as a Biofumigant in Vegetable Systems, Part 1 https://www.youtube.com/watch?v=qJU6ZFjW7wY
- VIDEO: High Glucosinolate Mustard as a Biofumigant in Vegetable Systems, Part 2 https://www.youtube.com/watch?v=TJC645-fDaE
- WEBINAR: Use of High Glucosinolate Mustard as an Organic Biofumigcant in Vegetable Crops http://articles.extension.org/pages/74057/use-of-high-glucosinolate-mustard-as-an-organic-biofumigant-in-vegetable-crops-webinar-by-eorganic
- RESEARCH REPORT: High Glucosinolate Mustard as a Biofumigant http://www.uvm.edu/extension/cropsoil/wp-content/uploads/2016-HGM-Trial.pdf
- MANUAL: Using HGM as a Cover Crop to Reduce Weeds and Disease http://www.uvm.edu/extension/cropsoil/wp-content/uploads/HGM-manual-final.pdf

Project 8: Development of a Vermont Produce Safety and Market Access Program – Final Report (Previously Accepted)

PROJECT SUMMARY

Food safety is a paramount issue facing Vermont fruit and vegetable operations. Producers want to produce safe and healthy food that consumers demand and that protects the quality reputation and brand associated with Vermont agriculture. Most wholesale and retail customers seek assurance that food safety practices are being followed by all farms they purchase from. Many customers are more than ever aware of where their food comes from and demand connection to the local growers that represent Vermont's community-based agriculture system.

Vermont's produce industry, as represented through the Vermont Vegetable and Berry Growers Association (VVBGA) membership, is receptive to the Vermont Agency of Agriculture, Food, and Markets (VAAFM) providing food safety planning support and pro-active compliance with food safety regulations. Since 1998, USDA Good Agricultural Practices (GAPs) have provided voluntary guidelines and a certification process for produce farmers to reduce the risk of microbial contamination related to

food borne illnesses on their farms. Less than 30 Vermont producers seek GAP certification annually. Now, many producers are pro-actively preparing to adapt to new pending regulatory requirements associated with the U.S. FDA's implementation of FSMA (Food Safety Modernization Act) which will release final rules by the end of June 2015.

Upon adoption of final FSMA rules, operations will have 2-4 years, based on farm size, to come into compliance. Once FSMA is implemented, many fresh produce growers will be required to adopt and document rigorous production and handling practices that reduce food safety risks. The proposed rules as they are currently drafted exempt smaller farms with less than $500,000 in annual food sales if at least 50% is sold to retail customers within a 275-mile radius. Consequently, many Vermont growers may not be covered under FSMA regulations. According to the Vermont Vegetable and Berry Growers Association, producers – regardless of total sales or customer base – are indicating their willingness to participate in food safety planning and implementation of on-farm production and handling practices. The sentiment is that food safety is essential on all farms - of all sizes - as it influences market access, impacts economic development within the agricultural sector, and represents Vermont's prominence around value, quality, and brand.

VAAFM supports the premise of a state-level FSMA-compliant produce safety program that offers market opportunity for Vermont growers, and preserves consumer confidence in Vermont food products. VAAFM has been working with FDA officials and leadership within the National Association of State Departments of Agriculture (NASDA) to develop a set of federal rules that will work for specialty crop producers in the northeast. This SCBG project aimed to establish VAAFM staff capacity to create the framework for a state-level produce safety program in collaboration with FDA, UVM Extension, and the fruit and vegetable industry program that focuses on education, technical assistance and outreach for compliance prior to enforcement.

At the start of this project, VAAFM lacked the statutory authority to implement a produce safety regulatory program. Numerous states across the country did have existing state-level produce programs, likely with components VAAFM could consider adopting. As FDA approached the final rule deadline of June 2015, the need to have a FSMA policy liaison becomes imperative. This project would allow for increased state and federal partnerships and improved communication within Vermont and amongst states regarding FSMA. Although VAAFM is aware that a segment of Vermont's fruit and vegetable industry will likely be responsive to a state-level produce safety regulatory program, we originally lacked industry perspective on legislative and regulatory recommendation and program structure to best prepare for FSMA compliance requirements. Consequently, this project was designed to offer VAAFM staff capacity to:

- Assess and consider alignment of state produce programs across the country;
- Survey and prepare the state's specialty crop industry for pending FSMA regulations and adoption of a state-level regulatory program; and
- Develop both a functional and regulatory framework within VAAFM to create a produce program that accommodates FSMA and meets the produce industry's needs.

At the time of application, no other federal or state grants were funding VAAFM to engage in this scope of work. UVM Extension was submitting proposals to develop a scale-appropriate, produce safety accreditation program, which could serve as a valuable compliment to the VAAFM's program research and development objectives.

Our hope was that early engagement with the industry and stakeholders would help build the relationships necessary to create a workable program that Vermont's produce industry would be

supportive of, that would align with FSMA requirements, and would achieve our public service and industry support roles.

PROJECT APPROACH

GOAL 1: ANALYZE AND SHARE SURVEY RESULTS OF AGRICULTURAL AND FOOD BUSINESSES AFFECTED BY FSMA AND ITS IMPACT ON MARKET DEMAND

TASK 1: SHARE SURVEY RESULTS OF AGRICULTURAL AND FOOD BUSINESSES AFFECTED BY FSMA

In December 2014, VAAFM hired a Produce Safety Coordinator, Kristina Sweet, to initiate the development of a state level produce safety program in Vermont. One of staff's first tasks was to estimated # of Vermont operations growing fruit and/or vegetables using 2012 NASS data via a procedure verified by NASS statistician for New England.

In March 2015, VAAFM distributed a survey to Vermont operations that grow, harvest, pack or hold and sell produce. We received 123 responses by November 2015, which were then evaluated by a group of Tuft's students to analyze the survey results. Their preliminary results determined the following:

- 86% of respondents grow "raw'"produce
- Of the 14% that grow produce rarely consumed raw—and not covered under the new rule—more than half anticipate diversifying within the next three years into other produce items that are covered
- 47% of respondents have produce sales over $25,000
- 31.5% of respondents already have a food safety plan, and another 37% plan to create one
- 12% (9 farms) of VT survey respondents had attended GAPs Workshop
- Only 11 farms hold certifications, including 6 HACCP certifications

As of December 2016, we have received over 240 survey responses. The next phase of this work, supported under additional SCBG funding, will be release a similarly styled decision-tree to produce growers that includes farm inventory and operation demographic questions. This first phase survey's purpose was an educational tool for the producers to determine their likely coverage under the rule. While we have 240 survey responses, we have also assembled a database of over 650 produce operations within Vermont to begin a more intensive outreach effort. This next outreach effort, beginning in early 2017, will also serve the development of a farm inventory database of produce operations that is currently required by FDA.

GOAL 2: DEVELOP A VERMONT PRODUCE SAFETY PROGRAM THAT MEETS INDUSTRY NEEDS

TASK 2: SURVEY WHOLESALES BUYERS TO ASSESS DEMAND FOR FOOD SAFETY CERTIFICATION AND/OR FSMA COMPLIANCE

This wholesale buyer connection task has proven to fall later on in the outreach and education process than we previously anticipated. The buyer survey was under discussion between VAAFM and UVM Extension staff but was never created. Instead a more comprehensive buyer engagement process will be initiated in a buyer and distributor meeting in 2017. Throughout this project we determined alternative critical engagement points to develop a produce safety program that meets industry needs. Those accomplishments are as follows:

a) Establish a Produce Safety Advisory Group with industry representatives

The concept behind the creation of this industry Advisory Group is to share program component or design concepts with industry representatives for discussion and analysis of impact. The first Advisory Group meeting includes questions around the following programmatic components:

- How do you recommend we gather background information about Vermont produce growers?
- How do we support market access and prevent competitive disadvantages to farms not fully covered under the rule?
- Can you anticipate that industry will need to make on-farm capital infrastructure improvements to achieve compliance with Produce Safety Rule?
- Can you provide feedback on education, technical assistance and training needs of the produce industry?
- Discussion around the vagaries of the Produce Safety Rule versus having more prescription in the federal rule

This first conversation was scheduled for December 19, 2016 but postponed due to limited attendance before the holidays. To ensure we have robust industry representation, we have postponed this meeting into January-February 2017.

b) Convene a Produce Safety Technical Service Providers meeting

On December 16, 2016, a dozen technical services providers (TSPs) joined for a conversation to discuss the current technical assistance roles currently being offered to the produce community, identification of gaps in service, and opportunities for collaboration moving forward to ensure that all VT produce operations are best served and supported.

This was a very successful first meeting that identified current roles and responsibilities and conversation about how the industry needs and resultant supports will evolve with the introduction of FSMA's Produce Safety Rule. These TSPs agreed to meet again in the spring, early summer 2017 to continue developing the support services needed by the produce industry.

The takeaway from these outreach meetings has been that early engagement and transparent conversation with industry representatives and stakeholders is a valuable approach to building consensus and collaboration. Overall we feel we have support for creation of Vermont's Produce Safety Program and we have developed the necessary relationships to continue to ask challenging questions and build workable solutions.

GOAL 3: DRAFT REGULATORY FRAMEWORK OF PRODUCE SAFETY PROGRAM FOLLOWING RELEASE OF FINAL FSMA PRODUCE SAFETY RULE

TASK 3: HOST SPECIALTY CROP INDUSTRY LISTENING SESSIONS TO GATHER FEEDBACK ON REGULATORY PROGRAM STRUCTURE AND CONTENT

VAAFM representatives committed 2015 as a period to engage in informal discussions with produce industry stakeholders and producers about the feasibility and support for a state level produce safety program. Conversations have occurred with the following:

a) Staff held a targeted stakeholder advisory meeting during fall 2015 with representatives across the supply chain to review a first draft produce safety program.

   VAAFM hosted a Produce Safety Program Stakeholder Meeting on September 24, 2015. 10 industry representatives attended this this facilitated conversation about how VAAFM will implement a Produce Program with both outreach, education and technical assistance components combined with

compliance and enforcement responsibilities. This first meeting created opportunity for industry stakeholders to ask questions about the Produce Safety Rule requirements as well as express concerns about the impact on the industry to achieve compliance with the rule.

The follow up meeting stakeholder meeting based on the evolution in development of Vermont's Produce Program will be held later in 2017. This meeting was delayed due to a need to further develop the Produce Program staff and determine the legislative agenda for 2017.

b) Secretary of Agriculture addressed Vermont Vegetable & Berry Growers Association (VVBGA) annual meeting in January 2015 and VAAFM's entire Produce Safety team made a presentation in fall 2015 on a proposed produce safety program and offered an updated to the VVBGA board in December 2016.

Various conversations have occurred with the VVBGA, UVM Extension, and other stakeholders on a one-on-one basis as requested. These meetings have always been an open dialogue about what our regulatory programmatic intensions are and our remaining questions regarding statutory authority. Various author questions still require FDA guidance or legal counsel – both of which will be received during 2016 and captured under a subsequent grant agreement.

c) Three educational meetings were held between March-April 2016.Throughout these three meetings, approximately 50 attendees engaged in conversations to understand the basic provisions of FDA's FSMA Produce Safety Rule and the early stage developments of Vermont's Produce Program. Most attendees were pleased to learn of VAAFM's commitment to create both an educational and regulatory program and understood that many of specific implications on their farm's operation would be answered in future technical assistance visits and guidance document development. A few producers were very concerned that this new federal regulation was going to make their business operation unsustainable. Overall, the industry and stakeholder comments have been valuable in our program development strategy.

Collaboration with the Vermont Department of Health (VDH) is also underway to delineate responsibilities for on-farm inspections (both produce safety and preventative controls). Staff levels meetings have occurred throughout 2015 and 2016 with a culminating discussion between Health Commissioner Harry Chen and Secretary of Agriculture Chuck Ross in November 2015 and a VDH and VAAFM team meeting to explore Memorandum of Understanding components in December 2016.

TASK 4: FORMULATE STATUTORY LANGUAGE WITH VT LEGISLATURE TO AUTHORIZE VAAFM TO REGULATE PRODUCE

VAAFM's produce safety team initiated the statutory authority process regarding conducting on-farm inspections and FSMA regulations. This process was primarily conducted between 2015 and 2016 legislative sessions, with successful passage of expanded statutory authority for VAAFM to regulate produce during the 2016 legislation session.

- VAAFM staff consulted with Agency counsel on process for introducing statutory language.
- Produce Safety Team provided testimony in spring 2015 to Vermont House Committee on Agriculture & Forest Products on FSMA impacts and timeline.
- Staff analyzed recent changes to Vermont statute granting the Secretary of Agriculture power to condemn adulterated produce.
- Numerous testimony was conducted during the 2016 legislative session before both House and Senate Agriculture committees to explain the program intensions and federal rule requirements.

- Expanded statutory authority for VAAFM to regulate the produce industry in alignment with the FSMA Produce Safety Rule requirements was passed and made effective May 2016.

Additional conversations are anticipated during the 2017 session, guided by legal counsel support, to determine if VAAFM will engage in a rule making process, policy development, or federal rule adoption by reference to maintain maximum authority to implement the Produce Safety Rule requirements. These activities will occur under a subsequent grant agreement and with financial support from a FDA Cooperative Agreement.

GOAL 4: COLLABORATE WITH NASDA AND FDA ON THE PILOT IMPLEMENTATION OF AN ON-FARM ASSESSMENT PROGRAM

TASK 5: ENGAGE NATIONAL PARTNERS – NASDA, FDA, AND CONGRESSIONAL DELEGATION – IN EFFORT TO SUPPORT STATES WITH FSMA IMPLEMENTATION

While a state level produce safety program development conversation is occurring with stakeholder and producers within Vermont, national conversations regarding funding, collaboration, and implementations processes are also occurring.

VAAFM staff are engaged in liaison efforts at the regional and national level regarding FSMA implementation policies and state program development

- Secretary of Agriculture presented FSMA compliance strategy at NEFDOA Annual Educational Conference and during NEASDA Conference.
- VAAFM staff participate in weekly National Association of State Department of Agriculture (NASDA) Technical Working Group calls, collaborate on chapters of NASDA Operational Plan for FSMA implementation, and assist UVM Extension on FSMA outreach and education
- VAAFM staff attended the FSMA Produce Safety Rule National State Agency Planning Meeting - March 22-24, 2016 in Orlando, FL to gather with all FDA, NASDA, and state produce program staff leadership to learn about national collaborations in drafting the Produce Safety Rule Implementation Strategy for all states to use as a state program development guidance document.
- Workshop presentation on FSMA at the NOFA-VT winter conference in February 2016.

There have been numerous examples of Vermont's programs and produce community benefiting from having our staff engaged at the national level – including On Farm Readiness Review pilots, farm inventory requirement preview, and successful FDA Cooperative Agreement development.

GOALS AND OUTCOMES ACHIEVED

GOAL 1: ANALYZE AND SHARE SURVEY RESULTS OF AGRICULTURAL AND FOOD BUSINESSES AFFECTED BY FSMA AND ITS IMPACT ON MARKET DEMAND

Performance Measure: 240 produce industry impact surveys completed

Benchmark: 2012 NASS data on # and variety of fruit and vegetable operations

To best capture the potential impact of FSMA on VT produce farms, VAAFM staff did an in-depth assessment of 2012 USDA Census of Agriculture data and identified the following estimations

- Vermont has 7,338 farms
- Between 1035-1148 farms grow covered produce in Vermont

- Of these farms, it's likely that at least 40% (503 farms) will be "not covered" due to annual produce sales average less than $25,000/year
- Another 45–50% (385-412 farms) will fall into the "qualified exemption" category

Target: Accurate accounting of impacted VT operations

So we're expecting approximately 150 farms will undergo inspections under the produce rule and between 500-600 farms will be covered by the rule and at least accountable to Qualified Exempt requirements.

GOAL 2: DEVELOP A VERMONT PRODUCE SAFETY PROGRAM THAT MEETS INDUSTRY NEEDS

Performance Measure: 3 listening sessions hosted

Benchmark: VT Vegetable and Berry Growers Association testimonial of support for a produce safety program

Target: Development of a state-level program that industry can live with

So far, all feedback from produce growers, industry representatives, and stakeholders is that our Vermont Produce Program development is on the right track. We are working hard to unify the objectives of public health and safe food production with business viability and market access. As long as we keep these objectives in mind as we continue to formulate our technical assistance and regulatory compliance efforts, we will be creating a state-level program the industry can live with.

GOAL 3: DRAFT REGULATORY FRAMEWORK OF PRODUCE SAFETY PROGRAM FOLLOWING RELEASE OF FINAL FSMA PRODUCE SAFETY RULE

Performance Measure: 2 state programs assessed

Benchmark: Vermont 'Emergency Powers' authority and FSMA draft rule reference to # of states with produce programs

Target: Promulgation and passage of rules for State of Vermont produce safety program

Vermont's Legislative Counsel worked with VAAFM staff to understand the FSMA establishing legislation and draft language for our state offering the necessary authorities to engage and regulate the produce industry. At least 2 states and all of the federal rule and Food Drug and Cosmetic Act were all consulted in the drafting of Vermont's new law, An act relating to State enforcement of the federal Food Safety Modernization Act which gives VAAFM the authority to enforce the federal Food Safety Modernization Act (FSMA) Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption (Produce Safety Rule).

GOAL 4: COLLABORATE WITH NASDA AND FDA ON THE PILOT IMPLEMENTATION OF AN ON-FARM ASSESSMENT PROGRAM

Performance Measure: 3 national meetings and 1 conferences attended to discuss FSMA

Benchmark: VAAFM Secretary of Agriculture active engagement in NEASDA and as NASDA president

Target: Open communication between FDA, NASDA, and VT beyond 10/1/14

National FSMA engagement can be time-consuming and require participation in webinars, conference calls, and national travel, but the benefits are tremendously helpful to understanding the relationship

dynamics between FDA and NASDA and states. The ultimate benefit of having state program staff engaged at the national level means we have a seat at the decision-making table to ensure small-scale farms, rural communities, and Vermont's culture of produce agriculture are represented in the decisions.

Attendance and presentations at various conferences, like the NOFA-VT winter conference in February 2016 allows for Vermont's program to be shared with produce growers and supply chain partners who want to ask questions, hope to assuage anxieties, and determine a point of contact to ask specific questions and acquire resources. This funding made this level of one-on-one relationship possible.

BENEFICIARIES

Vermont's produce industry, technical assistance provider organizations, and NASDA have primarily benefited from this project's accomplishments.

This work has created resources for at least the 650 produce operations in our database that have received information, invitations to meetings, notification of listening sessions, and reminders about attending trainings to better understand the Produce Safety Rule requirements.

The outreach and educational efforts of these program development efforts have provided at least nine opportunities for conversations between project partners about how we move forward supporting public health, market access, and produce operation sustainability through regulatory literacy. Dozens of industry stakeholders have participated in these educational efforts.

The resources and efforts undertaken through the use of these SCBG resources have also advised others states – specifically Massachusetts – and NASDA who has shared Vermont templates with other states for considered adoption.

LESSONS LEARNED

One of the most valuable decisions VAAFM made in creation of their Produce Safety Program was utilizing SCBG funds to hire a Produce Safety Program Coordinator in December 2014. Not only has that individual, Kristina Sweet, been an outstanding advocate for produce safety and industry engagement efforts but the ability to have a staff person committed to program development, research, and industry outreach while we awaited federal budget allocation from congress was critically important.

An additional insight was around the value and benefit to early stage engagement and outreach to producers and industry representatives about program development. We found that involving stakeholders in very transparent decision-making and programmatic strategizing, we are more likely to have support organization alignment and industry trust.

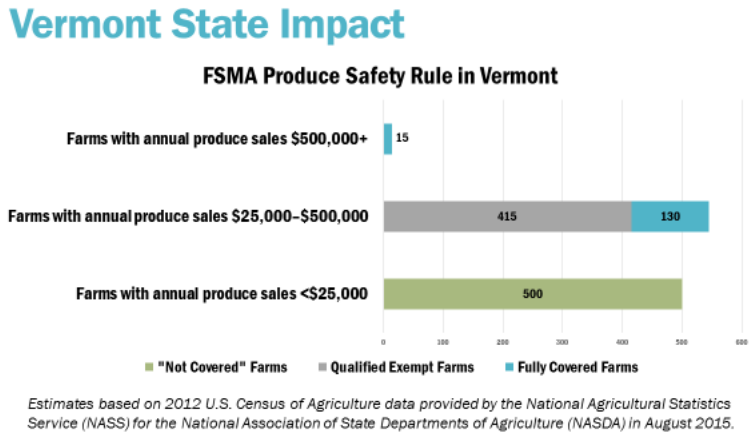
We have also identified the value of collaboration with national partners and legislative policy makers. The passage of expanded statutory authority surrounding regulation of the produce industry – aligned with the Produce Safety Rule – was not difficult to pace through our state legislator. We did not receive any significant opposition during testimony nor did we need to engage in any heavy negotiation to pass the law. Instead, the relationship building and transparent information sharing efforts created a culture of trust and understanding.

CONTACT PERSON

Abbey Willard, Food Systems Section Chief, Vermont Agency of Agriculture, Food & Markets
802-272-2885 | abbey.willard@vermont.gov

ADDITIONAL INFORMATION

The following slides have been presented to multiple industry groups and partner organizations.



Key Requirements
(Fully Covered Farms)

Conditions and practices that may contribute to microbial contamination of produce	**Agricultural water**	
	Biological soil amendments of animal origin (BSAAO)	**Raw manure**
		Stabilized compost
	Domesticated & wild animals	
	Equipment, tools, buildings & sanitation	
	Worker health & hygiene	

Modified Requirements
(Qualified Exempt Farms)

Record-keeping

A farm eligible for a qualified exemption must establish and keep adequate records necessary to demonstrate that the farm satisfies the criteria for a qualified exemption, including a written record reflecting that you have performed an annual review and verification of your farm's continued eligibility for the qualified exemption.

Farms eligible for a qualified exemption should begin keeping records to support their eligibility now.

Compliance date for retention of records supporting eligibility under the qualified exemption: January 26, 2016

Labeling

A qualified exempt farm must label produce covered under the Produce Safety rule with the name and complete business address of the farm where the produce was grown on produce packaging; at the point of purchase; on documents delivered with the produce; or in an electronic notice (in the case of internet sales).

A farm's qualified exemption may be withdrawn

DRAFT Mission Statement

The Vermont Produce Program will help to grow Vermont's produce industry—in the face of regulations and evolving market expectations—by aiding produce farms of all sizes and stages of development to meet food safety requirements, access markets, and promote public health as sustainable agricultural businesses.

This program will serve Vermont farms that grow and sell produce and engage critical external partners across a **produce safety program continuum** to ensure the industry feels educated and supported and has the tools to achieve compliance.

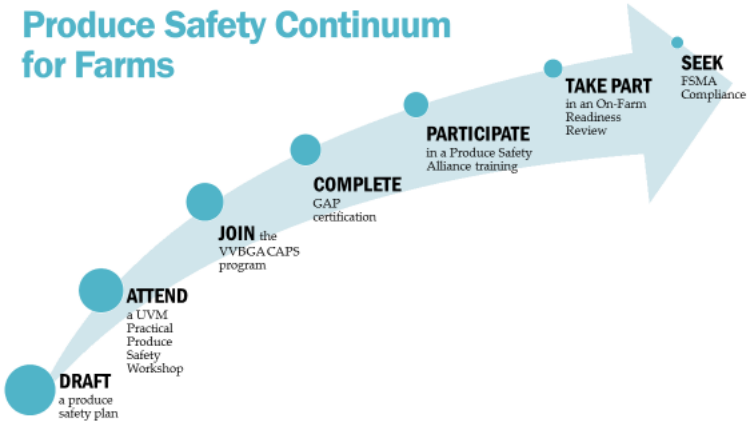
VAAFM Activities

- FDA publishes proposed FSMA rules
- VAAFM forms internal food safety team
- FDA Hearing in Hartford CT
- VAAFM Meets with Congressional Delegation
- VAAFM Holds Legislative Informational Session
- FDA Public Hearing with Farm Tours in NH & VT
- VAAFM Submits Comments on Proposed Rules to FDA

- Michael Taylor, FDA Deputy Commissioner for Foods meets with VAAFM & Senator Leahy
- VAAFM Staff Join NASDA Technical Working Group
- FDA Publishes Supplemental Proposed Rules
- VAAFM Hosts Webinar to Encourage Comment Submission & FDA Hearing in S. Royalton
- VAAFM Staff Join FDA/NASDA Implementation Group

- Hired Produce Safety Coordinator with USDA AMS Specialty Crop Block Grant Program funding
- Analysis of US Census of Agriculture Data to Determine Number of VT Farms Growing Produce
- VAAFM Joins Advisory Committee for Vermont Vegetable & Berry Growers Association CAPS Program
- VAAFM Launches Produce Safety Survey & FSMA Interactive Resource
- FSMA Implementation Kick-off Meeting April 23–24 in D.C.
- VAAFM Conducts Vermont Industry & Stakeholder Outreach

Produce Safety Continuum for Farms



Vermont Produce Program Development

2015	2016	2017	2018
• Initiate stakeholder & industry outreach • Develop relationships with FDA and National Association of State Departments of Agriculture (NASDA)	• Obtain expanded statutory authority at the state legislature • Obtain resources for program from FDA & hire staff • Develop education, outreach & training • Seek guidance from industry advisory group	• Develop regulatory program framework • Hire & train inspection staff • Pilot On-Farm Readiness Reviews (OFRR) • Continue to work with federal, state & industry partners	• Continue to deliver OFRR and technical assistance • Launch Capital Infrastructure Grant Program • Begin mandatory inspections for farms with $500,000+ in annual produce sales

5 Year FDA Cooperative Agreement Program Components

Outreach, Education & Technical Assistance

- Staff: 2 positions focused on outreach & education
- Collaboration with UVM Extension
- Grower training
- On-Farm Readiness Reviews

Compliance

- Staff: 3 inspectors by 2019
- Inspections for fully covered farms beginning in 2018
- Facilitate implementation of water testing requirements

Upcoming Collaboration

December 2016

- Technical Service Providers Meeting
- Advisory Group Meeting

January 2017

- NECAFS Annual Meeting
- VVBGA Annual Meeting

February–March 2017

- NOFA-VT Winter Conference
- Buyer/Distributor Meeting
- Large Stakeholder Meeting
  Growers, Service Providers, Buyers/Distributors, Associations, Advocacy Organizations
- National Consortium for Produce Safety Program Development

June 2017

- Vermont On-Farm Readiness Review Pilot

agriculture.vermont.gov